



ШЕСТОЙ  
МЕЖДУНАРОДНЫЙ  
КОНГРЕСС  
ПО ХИМИИ  
ЦЕМЕНТА

THE SIXTH  
INTERNATIONAL  
CONGRESS  
ON THE CHEMISTRY  
OF CEMENT

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**THE SIXTH  
INTERNATIONAL  
CONGRESS  
ON THE CHEMISTRY  
OF CEMENT**

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**PROCEEDINGS IN THREE VOLUMES**

**Volume I**

**CHEMISTRY  
OF CEMENT CLINKER**

*Engl. Übers.*

*s. Suppl. Papers [1-46]*

*s. Principle Paper*

E. Thilo, Professor, doctor (German Democratic Republic)  
J. Hedvall, Professor, doctor (Sweden)  
F. Keil, Professor, doctor (German Federal Republic)  
H. Lafuma, Professor, doctor (France)  
R.W. Nurse, doctor (United Kingdom)  
S.D. Okorokov, Professor, (USSR)  
I.F. Ponomarev, Professor, doctor (USSR)

Official languages of the Congress. Official languages of the Congress are Russian and English in which papers, collection of synopses of supplementary paper and other pertinent materials will be presented and published.

Notwithstanding this provision, any presentation at the Congress may be delivered in one of the following languages: Russian, English, French and German.

Simultaneous translation from each of the above-mentioned languages into the three other will be provided at the Congress.

## II. SCIENTIFIC PROGRAM OF THE CONGRESS

The Scientific Program of the Congress contemplates considering and discussing the present-day state and problems of science in the field of the chemistry of cement with the aim to give impetus to the development of new ideas and employment of the results of the research in the interests of the progress of the chemistry and technology of cement.

The focus of attention there is on the following main directions of the development of the science of cement.

Section I Chemistry of cement clinker.

Section II Hydration and Hardening of cement.

Section III Cements and their properties.

1. Principal Papers. In conformity with the above-mentioned directions of the Scientific Program the Organizing Committee of the USSR has adopted a list of the following principal papers, recommended by the Program Committee:

#### Section I. CHEMISTRY OF CEMENT CLINKER

- I-1. Chemistry and Crystalllochemistry of Cement Minerals (N.V.Belov, Acad., Dr. Sc., Prof., E.N.Belova, USSR)
- I-2. The Crystal Chemistry of the Constituents of Portland Cement Clinker (M.Regourd, Dr., A.Guinier, Acad., Prof., France)
- I-3. Phase Composition of Portland Cement Clinker (W.Gutt, Dr., R.Nurse, Dr. Sc., United Kingdom)
- I-4. The Mechanism of Clinker Formation Processes and Ways of Modification of Clinker Structure (Yu.M. Butt, Dr. Sc., tech., Prof., V.V. Timashev, Dr. Sc., tech., Prof., A.P.Osokin, USSR)
- I-5. Present-day Methods of Investigation of the Clinker Formation Mechanism and Clinker Phase Composition (G.Yamaguchi, Dr., Prof., Sh. Takagi, Japan)
- I-6. Thermodynamics and Thermochemistry of Cement (O.P.Mchedlov - Petrosyan, Dr. Sc., Prof., V.I.Babushkin Dr. Sc., USSR)

#### Section II. HYDRATION AND HARDENING OF CEMENT

- II-1. Regularities of Binding Property manifestation (M.M. Sychev, Dr. Sc. tech., Prof., USSR)
- II-2a Investigations on the Hydration mechanism of Clinker Minerals (U.Ludwig, Prof., Dr., German Federal Republic)

- II-2b Study of the Hydration Mechanism of Cement (F.Locher, Prof., Dr., W.Richartz, Dr., German Federal Republic)
- II-3. Phase Composition of Hardened Cement Paste (R.Kondo, Prof., Dr. Sc., M.Daimon, Dr., Japan)
- II-4. Crystal Chemistry of Portland Cement Hydration Products (H.F.W. Taylor, Dr. Sc., Prof., United Kingdom)
- II-5. Structure and Properties of Hardened Cement Pastes (L.E.Cope-land, Dr., G.J.Verbeck, USA).
- II-6. Effect of Chemical Additions on Hydration Processes and Hardening of Cement (F.Vavřin, Dr. Sc., Prof., Czechoslovakia)
- II-7. Hydration Processes at the Early Stages of Cement Hardening (G.L.Kalousek, Dr., USA)
- II-8. Effect of Elevated Temperatures and Pressures on the Hydration and Hardening of Cement (M.Venuat, Dr. Sc., Prof., France)
- II-9. New Methods for the Investigation of the Hydration Processes of Portland Cements (W.Wicker, Dr. Sc., German Democratic Republic)

### Section III. CEMENTS AND THEIR PROPERTIES

- III-1. Rapid-Hardening and High-Strength Portland Cements (I.V.Kravchenko, Dr. Sc., Prof., USSR)
- III-2. Slag Portland Cement (V.I.Satarin, Dr. Sc., tech., Prof., USSR)
- III-3. Fly-ash cements (M.Kokubu, Dr., Prof., J.Yamada, Dr., Japan)
- III-4. High-alumina Cements (J.Talaber, Dr., Hungary)
- III-5. Expansive Cements (P.Mehta, Dr., Prof., M.Polivka, Prof., USA)
- III-6. Chemistry of Pozzolanic Additions and Mixed Cements (F.Massazza, Dr. Sc., Prof., Italy)

III-7. Oil-well Cements (S.M.Royak, Prof., USSR)

III-8. The Chemistry of White and Coloured Cements (I.Teoreanu, Prof., Dr. Sc., Romania)

III-9. Cement-Polymer Materials (G.Idorn, Dr. Sc., Z.Fördös, Denmark)

III-10 Combined Methods of Cement Production (E.Grzymec, Acad., Prof., Dr., Poland)

III-11 Present Methods for Mechanical Testing of Cements (P.Dutron, Belgium, Rilem, C.Bang Petersen, Denmark, S.Kral, Switzerland)

2. Supplementary Papers and General Reporters. Taking into consideration numerous requests and wishing to offer an opportunity to report at the Congress on the results of their research to maximum possible number of participants the Organizing Committee has found it advisable to include a number of supplementary papers corresponding to the subjects of the principal papers.

Regarding the recommendations of the Program Committee the Organizing Committee of the USSR has selected 195 supplementary papers which most fully comply with the aims and the scientific program of the Congress and are original in content.

The contents of these papers in generalized form (grouped together as to the subjects of the corresponding principal papers) will be reported at the Congress by the General Reporters, invited specially by the Organizing Committee from the number of the most prominent scientists.

The Organizing Committee of the USSR adopted the following list of supplementary paper and grouped them according to the main sections of the Scientific Program, principal papers and General Reporters:

№	Given Index	Authors (country)	Paper Title
1.	2	3	4

Section I. CHEMISTRY OF CEMENT CLINKER

Supplementary papers on the topic  
of the principal paper:

I-I N.V.Belov, E.N.Belova  
(USSR) Chemistry and Crystallochemistry of Cement Minerals

I-2 M.Regourd, A.Guinier  
(France) The Crystal Chemistry of the Constituents of Portland Cement Clinker

I. General Reporter A.I.Boykova (USSR)

1.	1-1 1-2	G.Roed (Denmark)	Tricalcium Silicate Solid Solutions in the System $\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2$
2.	1-1 1-2	V.I.Korneyev (USSR)	Compositions Zones of Silicate Phases in Portland Clinker
3.	1-1 1-2	A.I.Boykova, M.G.Degen, V.A.Paramonova (USSR)	Defect State of Solid Solutions of Dicalcium Silicate
4.	1-1 1-2	H.G.Midgley (United Kingdom)	The Polymorphism of Calcium Orthosilicate
5.	1-1 1-2	G.Mascolo (Italy) W.Eysel, Th.Hahn, E.Woermann (German Federal Republic)	Thermal Behaviour of Synthetic Alites
6.	1-1 1-2	Yo. Ono (Japan)	The Crystal Structure and the Morphology of Alite

Supplementary paper on the topic  
of the principal paper:

I-3 W.Gutt, R.W.Nurse  
(United Kingdom) The Phase Composition of Portland Cement Clinker

I	2	3	4
<b>2. General Reporter B.V.Volkonsky (USSR)</b>			
1.	1-1 1-2	M.A.Teder, V.K.Saaremets, N.L.Dilaktorsky, I.A.Rozhnova (USSR)	Diagrams of Equilibrium of Portland Cement Melts
2.	1-1 1-2	A.K.Chatterjee (India)	Stability of Tricalcium Aluminate in the Lime- Alumina-Fluorite System
3.	1-1 1-2	M.Pezzuoli (Italy)	Influence of Strontium on the Clinker Mineralogical Composition
4.	1-1 1-2	P.Batti, E.Lucchini (Italy)	Partial Phase Diagram of the System $\text{CaO}-\text{SrO}-\text{Al}_2\text{O}_3-\text{SiO}_2$
5.	1-3	W.Gutt, M.A.Smith (United Kingdom)	Studies of Phosphatic Portland Cement
6.	1-3	C.Schmitt-Henko (German Federal Republic)	Magnesium Oxide Content of Clinker, Autoclave Test and Soundness
7.	1-3	K.G.Kolenova (USSR)	Factors Determining Com- position of Alumoferrite and Aluminate Phases of Portland Cement Clinker and their Effect on Coat- ing - Formation and Clinker Granulation Processes
8.	1-3	Yu.V.Nikiforov, R.A. Zozulya, N.M.Ivanova (USSR)	Role Played by Magnesia in Clinker and Cement Technology
9.	1-3	M.Enculescu (Rumania)	Influence of Oxides of Transitional Elements on the Properties of Minera- logical Components of Clinkers

Supplementary papers on the topic  
of the principal paper:

1-4	Yu.M.Butt, V.V.Timashev, A.P.Osokin (USSR)	Mechanism of Clinker Formation Processes and the Modification of Its Structure
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I	2	3	4
<b>3. General Reporter P.F.Rumyantsev (USSR)</b>			
1.	1-4	P.V.Zozulya, M.M.Sychev, A.B.Upolovnikov; H.J.Wälchtler (USSR)	On the Composition of the Liquid Phase of Portland Cement Clinker
2.	1-4	B.I.Nudelman (USSR)	Clinker Formation in Cal- cium Chloride Melt
3.	1-4	V.V.Timashev, B.S.Albats (USSR)	The Process of Liquid- phase sintering of Portland Cement Clinker
4.	1-4	B.V.Volkonsky, N.A.Olesov (USSR)	Specific Features of Mine- ral Formation in Clinker in Complex Production
5.	1-4	A.S.Muminov, M.A.Akhmedov (USSR)	On the Interaction of Ba- rium Chloride with the Calcium Aluminates in the Solid Phase Conditions at High Temperatures

Supplementary papers (continuation) on  
the topic of the principal paper:

I-4	Yu. M. Butt, V.V.Timashev, A.P.Osokin (USSR)	Mechanism of Clinker For- mation Processes and the MO- dification of Its Structure
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**4. General Reporter G.Sulikowski (Poland)**

1.	1-4	V.L.Shestakov, V.Z. Pirotsky (USSR)	Effect of Cooling Condi- tions and Modifying Ad- mixtures on Hardened Melt Properties
2.	1-4	N.P.Kogan, O.P.Mchedlov- Petrosyan, V.I.Satarin (USSR)	Physico-Chemical Processes of Clinker Burning at Redu- ced Temperatures in Rotary Kilns
3.	1-4	G.Frigione, S.Marra (Italy)	Effect of Burning Time on Characteristics of Clinker
4.	1-4	M.Ono, M.Nagashima (Japan)	Effect of Cooling Condi- tions of Clinker on Strength of Cement

I	2	3	4
5.	1-4	W.Kurdowski (Poland)	Influence of Minor Components on Hydraulic Activity of Portland Cement Clinker
6.	1-4	B.S.Rangnekar, V.R.G.Srinivasan, V.N.Pai (India)	An Early Hardening C <sub>2</sub> S Phase Made by Rapid Heating Technique

Supplementary papers (continuation)  
on the topic of the principal paper:

I-4	Yu.M.Butt, V.V.Timashev, A.P.Osokin (USSR)	Mechanism of Clinker Formation Processes and the Modification of Its Structure
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5. General Reporter W.Kurdowski (Poland)

1.	1-4	M.F.Chebukov, V.A.Pyachev, I.F.Koryakov, V.M.Ufimtsev, V.E.Meyke, V.I.Ivanov, V.N.Cherepanova (USSR)	Rational Charge Composition for Rapid Burning
2.	1-4	S.D.Makashev (USSR)	Effect of Raw Material Physico-Chemical Properties on Reactivity of Raw Mix and on Clinker Minerogenesis Processes
3.	1-4	O.Philipp, R.Schrader (German Democratic Republic)	Application of Thermal, Chemical and Mechanical Activation in Clinker Burning
4.	1-4	V.I.Shubin (USSR)	Investigation into Consolidation of Portland Cement Clinker
5.	1-4	H.Kock, G.Rey, F.Becker (Switzerland)	A Statistical Model for Determining the Burnability of Cement Raw Mixes
6.	1-4	M.T.Vlasova (USSR)	Periodicity of Clinker-Formation Processes
7.	1-4	A.A.Pashchenko, E.A.Starchevskaya, V.P.Serbin (USSR)	Research in Belite Synthesized in the Low Temperature Area

I	2	3	4
8.	1-4	L.I.Malozhon, P.A.Trofimov, V.F.Berezovoy, M.S.Fomenko (USSR)	The Study of the Modifying Additives Effect on the Bin- ding Process of CaO During Clinker Burning
9.	1-4	G.D.Uryvaeva, A.T.Logvinenko, A.S.Tretyakova (USSR)	Peculiarities of Clinker Formation in a High-Frequen- cy Field.

Supplementary papers on the topic  
of the principal paper:

I-5	G.Yamaguchi, Sh.Takagi (Japan)	Present-Day Methods of Investigation of the Clinker Formation Mecha- nism and Clinker Phase Composition
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#### 6. General Reporter Yu.S.Malinin (USSR)

1.	1-5	A.G.Kholodny, V.F.Gribko (USSR)	Electron Microscopic Inves- tigation of Cement Clinker and Stone Fracture Using Sighting Replicas
2.	1-5	I.V.Bogdanova, E.P.Kobrina, V.N.Maksimov (USSR)	X-Ray Spectral Analysis of Cement for Gypsum and Slag
3.	1-5	B.E.Yudovich, U.I.Papiashvili, V.A.Dmitrieva (USSR)	Electronic Microfractography of Portland Cement Clinker
4.	1-5	V.P.Ryazin, L.S.Zevin, Yu.S.Malinin, V.N. Udovichenko (USSR)	Application of X-Ray Diffrac- tion for the Determination of the Phase Composition of Clin- ker and Cement
5.	1-5	I.Voinovitch, G.Legrand, J.Louvrier (France)	Effect of an Internal Stan- dard on the Accuracy of De- termination of Calcium in Cements by Atomic Absorption Spectrometry

I	2	3	4
6.	1-5	T.Yu.Shchetkina, L.N.Skrynnik, P.A.Starominskaya (USSR)	Results of the Studies on Some Clinker Minerals by Means of X-Ray Diffractometry and Spectrometry
7.	1-5	V.V.Myshlyaeva, M.N.Lukina (USSR)	Progress in Chemical Control of Cement Production
8.	1-5	S.Diamond (USA)	Energy Dispersive X-Ray Analysis of Cement Systems.
9.	1-5	J.A.Imlach, F.Hofmänner (Switzerland)	Investigation of Clinker Formation by DTA and Optical Microscopy
10.	1-5	I.D.Berkhoer, N.I.Komyak, A.N.Mezhevich, M.I.Sorin (USSR)	X-Ray Spectral Analysis in the USSR Cement Industry
11.	1-5	A.Bezjak, I.Jelenić (Yugoslavia)	New Method for Phase Analysis of Cement Clinker

Section I. CHEMISTRY OF CEMENT CLINKER

Section II. HYDRATION AND HARDENING OF  
CEMENT

Supplementary papers on the topic  
of the principal papers:

I-6	O.P.Mchedlov-Petrosyan, V.I.Babushkin (USSR)	Thermodynamics and Thermochemistry of Cement
II-1	M.M.Sychev (USSR)	Regularities of Binding Property Manifestation

7. General Reporter D.M.Roy (USA)

1.	I-6 II-1	V.V.Danilov (USSR)	On Hydration Mechanism in Cement Pastes
2.	I-6 II-1	I.P.Vyrodov (USSR)	On Some Main Aspects of Hydration Theory and Hydration Hardening of Binders

I	2	3	4
3.	1-6 II-1	L.B.Tsimermanis, D.I.Shtakelberg, A.R.Genkin (USSR)	Thermodynamic Analysis of Mineral Binder Hardening in Closed System
4.	1-6 II-1	N.F.Fyodorov (USSR)	Synthesis and Properties of Special Cements
5.	1-6 II-1	A.F.Polak (USSR)	Kinetics of Cement Stone Structure Formation
6.	1-6 II-1	M.Y.Bikbau (USSR)	On Hydration Activity of Silicates
7.	1-6 II-1	A.V.Usharov-Marshak, A.M.Urzhenco (USSR)	Thermokinetic Analysis of Early Stages of Binder Hydration
8.	1-6 II-1	A.F.Shurov, M.A.Sorochkin, T.A.Ershova (USSR)	Physical Models of the Early Stages of Hardening of Binders
9.	1-6 II-1	I.B.Zasedatelev (USSR)	On the Temperature Heat Function of Hydration of Cement.
10.	1-6 II-1	C.J.M.Houtepen, H.N.Stein (The Netherlands)	The Enthalpy of Formation and of Dehydration of Some Calcium Aluminate Hydrates, with Univalent Anions
11.	1-6 II-1	V.V.Kapranov (USSR)	Interaction of the Liquid and Solid Phases in the Process of Cement Hydrati- on
12.	1-6 II-1	B.Matković, V.Rogić <sup>xx)</sup> (Yugoslavia)	Modified Magnesium Oxychlo- ride Cement

### Section II. HYDRATION AND HARDENING OF CEMENT

Supplementary papers on the topic  
of the principal papers:

<sup>xx)</sup>The paper is in Sinopses of Supplementary papers and is published  
seperately in Section III (III-5; General Reporter K.G.Krasilni-  
kov).

I	2	3	4
	II-2a	U.Ludwig (German Federal Republic)	Investigations on the Hydration Mechanism of Clinker Minerals
	II-2b	F.Locher, V.Richartz (German Federal Republic)	Study of the Hydration Mechanism of Cement
<u>8. General Reporter Z.Sauman (Czechoslovakia)</u>			
1.	II-2	A.E.Sheykin, I.I.Kurbatov, A.E.Fyodorov, V.N.Shvedov (USSR)	Effect of Sulphate-Bearing Phases on Cement Stone Strength
2.	II-2	S.A.Mironov (USSR)	Hydration and Hardening of Cement at Minus Temperatures
3.	II-2	B.S.Bobrov, A.M.Shikiryansky (USSR)	Mutual Influence of $3\text{CaO}\cdot\text{SiO}_2$ and $4\text{CaO}\cdot\text{Al}_2\text{O}_3\cdot\text{Fe}_2\text{O}_3$ in Portland Cement Hydration
4.	II-2	B.Werynski (Poland)	Influence of the Size Composition on the Properties of Cements
5.	II-2	I.P.Yanev, L.Mircheva (Bulgaria)	Kinetics of Hydration of Cements Containing Alkaline Clinker Minerals
6.	II-2	F.D.Tamás, T.G.Váradi (Hungary)	Role of Poly-Reactions in the Hydration of Cement
7.	II-2	F.V.Lawrence, J.F.Young, R.L.Berger (USA)	Hydration and Properties of Calcium Silicate Pastes
8.	II-2	J.Descamps, P.Fierens, J.P.Verhaegen (Belgium)	Chemical Defects and Hydration of Doped Tricalcium Silicates

I	2	3	4
9.	II-2	L.Opoczky, Z.Juhasz (Hungary)	Mechanochemical Phenomena on the Surface of Clinker Minerals
10.	II-2	A.Rio (Italy)	Approaching to a Macromolecular Characterization of the $C_3S$ Hydration Process
11.	II-2	Z.Sauman, Z.Valtr (Czechoslovakia)	Substitution of Sulfate Ions in the Crystal Lattice of 11A-Tobermorite
12.	II-2	R.Sierra (France)	Contribution to the Kinetic Study of Hydration of Tricalcium Silicate
13.	II-2	P.A.Rebinder, E.E.Segalova, E.A.Amelina, E.P.Andreeva, S.I.Kontorovich, O.I.Lukyanova, E.S.Solovyeva, E.D.Shchukin (USSR)	Physico-Chemical Aspects of Hydration Hardening of Binders

Supplementary papers on the topic  
of the principal papers:

II-3	R.Kondo, M.Daimon (Japan)	Phase Composition of Hardened Cement Paste
II-4	H.F.W.Taylor (United Kingdom)	Crystal Chemistry of Portland Cement Hydration Products
II-5	L.E.Copeland, G.J.Verbeck (USA)	Structure and Properties of the Hardened Cement Paste

9. General Reporter Th.Hahn (German Federal Republic)

1.	II-3 II-4 II-5	T.Mitsuda, H.F.W.Taylor (United Kingdom)	Normal and Anomalous Tobermorites
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I	2	3	4
2.	II-3 II-4 II-5	T.N.Nadezhina, N.V.Belov (USSR)	Production and Crystalline Structure of New Strontium Aluminate Hydrate $\text{Sr}_2\text{A}_2\text{H} -$ $\text{Sr}_4\text{Al}_4\text{O}_2 [\text{Al}_8\text{O}_{18}(\text{OH})_4]$
3.	II-3 II-4 II-5	T.Chiuchi, K.Kawaguchi (Japan)	Influence of $\text{Cr}_2\text{O}_3$ on the Formation of C-S-H (1), Tobermorite and Related Phases in Hydrothermal Con- dition
4.	II-3 II-4 II-5	H.Mori, G.Sudoh, K.Minegishi, T.Ohta (Japan)	Some Properties of C-S-H Gel Formed by $\text{C}_3\text{S}$ Hydration in the Presence of Alkali
5.	II-3 II-4 II-5	R.Dron (France)	Experimental and Theoretical Study of the $\text{CaO}, \text{Al}_2\text{O}_3,$ $\text{SiO}_2, \text{H}_2\text{O}$ System
6.	II-3 II-4 II-5	Th.Scheller, H.-J.Kuzel (German Federal Republic)	Studies on Dicalcium Aluminate Hydrates
7.	II-3 II-4 II-5	B.N.Litvin, O.V.Kudryavtseva (USSR)	Structure-Genetic Features of Phase Formation in the System of $\text{CaO}-\text{SiO}_2-\text{H}_2\text{O}$
8.	II-3 II-4 II-5	K.Suzuki (Japan)	Influences of Substituted Fe and Si on the Formation of Calcium Aluminate Phase and its Hydration
9.	II-3 II-4 II-5	V.D.Gluchovsky <sup>x)</sup> R.F.Runova (USSR)	The Properties of the Dis- persed Products of Cement Hydration
Supplementary papers on the topic of the principal papers (continua- tion):			
	II-3	R.Kondo, M.Daimon (Japan)	Phase Composition of Hardened Cement Paste
	II-4	H.F.W.Taylor, (United Kingdom)	Crystal Chemistry of Portland Cement Hydra- tion Products

I	2	3	4
	II-5	L.E.Copeland, G.J.Verbeck (USA)	Structure and Proper- ties of the Hardened Cement Paste
<u>10. General Reporter F.D.Tamás (Hungary)</u>			
1.	II-3 II-4 II-5	Yu.I.Mituzas, A.Yu.Kaminskas, A.Yu.Mituzas (USSR)	New Data on Phase Composi- tion of Hardening Cement Stone
2.	II-3 II-4 II-5	Yu.M.Butt, V.M.Kolbasov (USSR)	Influence of Cement Compo- sition and Hardening Condi- tions on Structure Formation of Cement Stone
3.	II-3 II-4 II-5	Z.N.Zilosani, A.V.Sakvarelidze (USSR)	The Structural Changes in the Drying Hardened Cement Paste
4.	II-3 II-4 II-5	R.Sersale (Italy)	Hydraulic Behaviour of Al, Fe, Mg - Bearing Alites
5.	II-3 II-4 II-5	R.Hedin (Sweden)	Strength and Structure of Mortar with Mixtures of Hydraulic Compounds
6.	II-3 II-4 II-5	A.Grudemo (Sweden)	Strength vs. Structure in Cement Pastes
7.	II-3 II-4 II-5	M.Nadu (Romania)	On the Sulphate Resistance of the Hardened Cement Paste
8.	II-3 II-4 II-5	Yu.V.Chekhovsky, L.E.Berlin (USSR)	On Kinetics of Pore Struc- ture Formation in Cement Stone
9.	II-3 II-4 II-5	J.Dyczek, M.Petri (Poland)	The Mechanical Properties of Calcium Silicate Hydrates Existing in Autoclaved Ce- ment - Quartz Materials
10.	II-3 II-4 II-5	R.F.Feldman, J.J.Beaudoin (Canada)	Microstructure and Strength of Hydrated Cement

I	2	3	4
11.	II-3 II-4 II-5	S.Popovich (USA)	Strength Development of Portland Cement Paste
12.	II-3 II-4 II-5	L.G.Shygynova, V.I.Sinenkaya, V.I.Chikh, I.I.Nikonets (USSR)	Formation of $B-C_2S$ and $C_3S$ Stone Microstructure
13.	II-3 II-4 II-5	G.S.Krykhtin, V.I.Zharko (USSR)	The Rate of Hydration and Dispersion of Cements
14.	II-3 II-4 II-5	D.M.Roy, G.R.Gouda (USA)	Optimization of Strength in Cement Pastes
15.	II-3 II-4 II-5	H.Ushiyama, S.Goto (Japan)	Diffusion of Various Ions in Hardened Portland Cement Paste
16.	II-3 II-4 II-5	D.A.Uginchus, Yu.P.Libenko (USSR)	Pore-Formation in Cement Stone on Exposure to Heat
17.	II-3 II-4 II-5	J.Jambor <sup>X</sup> ) (Czechoslovakia)	Phase Composition Structure and Strength of Hardened Cement Pastes
		Supplementary papers on the topic of the principal paper:	
	II-6	F.Vavřík (Czechoslovakia)	Effect of Chemical Additions on Hydration Processes and Hardening of Cement
1.	II-6	Z.M.Larionova (USSR)	The Stability of Ettringite in Cement Systems
2.	II-6	R.Greschuchna (German Democratic Republic)	Cement Paste Crystals in Sulphate and Acidic Solutions

11. General Reporter V.B.Ratinov (USSR)

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| 1. | II-6 | Z.M.Larionova (USSR)                       | The Stability of Ettringite in Cement Systems          |
| 2. | II-6 | R.Greschuchna (German Democratic Republic) | Cement Paste Crystals in Sulphate and Acidic Solutions |

I	2	3	4
3.	II-6	U.Ayapov (USSR)	On the Theory of Action and Classification of Accelerators of Cement Hardening
4.	II-6	I.G.Luginina, V.D.Barbanyagre, V.K.Klassen, A.N.Klassen, K.A.Ryabchenko, O.A.Drugova (USSR)	The Effect of Phosphorus on Cement Stone Properties
5.	II-6	J.Isogai (Japan)	Hardened Cement Paste Affected by Sea Water
6.	II-6	I.Odler, J.Skalny, S.Brunauer (USA)	Properties of the System Clinker-Lignosulfonate-Carbonate
7.	II-6	I.Teqreanu, M.Muntean (Romania)	Calcium Silicates-Water-Electrolyte Systems
8.	II-6	M.Colleopardi, A.Marcialis, L.Massidda, R.Turriziani (Italy)	Paste Hydration of $4\text{CaO} \cdot 3\text{Al}_2\text{O}_3 \cdot \text{SO}_3$ in the Presence of $\text{Ca}(\text{OH})_2$ , $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ and Some Organic Compounds
9.	II-6	V.S.Ramachandran (Canada)	Hydration of Cement. Role of Triethanolamine
10.	II-6	G.G.Litvan (Canada)	Frost Action in Cement Stone in the Presence of De-Icers
11.	II-6	A.Traetteberg, P.J.Sereda (Canada)	Strength of $\text{C}_3\text{A}$ Paste Containing Gypsum and $\text{CaCl}_2$
12.	II-6	V.A.Voznesensky (USSR)	Statistical Search for Optimal Chemical Additives
13.	II-6	O.Henning, R.Stieler (German Democratic Republic)	Alkaline-rich Cement Dust in Portland Cement
14.	II-6	W.Lieber (German Federal Republic)	The Influence of Phosphates on the Hydration of Portland Cement

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15.	II-6	T.I.Rozenberg, G.D.Kucheryaeva (USSR)	Concurrent Reactions of $C_2S$ and $C_3A$ with the Ad- dition of Electrolites
16.	II-6	V.B.Ratinov (USSR)	Classification of Additives by a Mechanism of their Effect on Cement
Supplementary papers on the topic of the principal paper :			
	II-7	G.L.Kalousek (USA)	Hydration Processes at the Early Stages of Cement Hardening
<u>12. General Reporter A.V.Volzhensky (USSR)</u>			
1.	II-7 II-8	L.G.Sudakas (USSR)	Regulation of Initial Processes on Hardening
2.	II-7 II-8	Z.Bruthans (Czechoslovakia)	Study of Magnetic Influence on the Hydration Process
3.	II-7 II-8	R.Magnan B.Cottin J.Gardet (France)	Initial Stages in the Hyd- raulic Activity of Sulphate, Aluminate and Silicate Com- pounds of Calcium
4.	II-7 II-8	G.V.Topilsky, T.P.Vasina, T.A.Bukatina (USSR)	Investigation on Liquid Phase Composition on Cement Hydration
5.	II-7 II-8	A.V.Volzhensky (USSR)	Effect of Cement and Hydrates Concentration and Dis- persion of New Formation on Stone Properties
6.	II-7 II-8	S.V.Shestoperov, A.H.Izmailov, V.S.Shestoperov (USSR)	Influence of $C_2A$ on Some Properties of Cement Stone
Supplementary papers on the topic of the principal paper:			
	II-8	M.Venuat (France)	Effect of Elevated Tempera- tures and Pressures on the Hydration and Hardening of Cement

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<b>13. General Reporter P.I.Bozhenov (USSR)</b>			
1.	II-7 II-8	S.Peukert (Poland)	Influence of Gypsum Additive on the Cement Mortars and Cement Pastes Exposed on the Short Duration Heat Treatment
2.	II-7 II-8	E.Skomorovsky (Poland)	The Study of the Cement Paste Structure Cured Under High Temperature
3.	II-7 II-8	V.Lach, J.Bures (Czechoslovakia)	The Phase Composition and Microstructure of Cement Pastes Hydrated at Elevated Temperatures
4.	II-7 II-8	M.S.Barvinok, P.G.Komokhov, N.F.Bondareva (USSR)	Effect of Temperature and Additives on the Early Stage of Hardening
5.	II-7 II-8	K.K.Kuatbayev, (USSR)	Characteristics of Phase Components of Hydrothermal-Ly-Hardened Cement
6.	II-7 II-8	Kh.S.Vorobyev, V.A.Sokolovsky (USSR)	Effect of Hardening System and Crystal Structure on Hydration Properties of Certain Silicates and Alumoferrites of Calcium under Conditions of Autoclave Treatment
7.	II-7 II-8	R.Krzywoblocka <sup>x</sup> Laurow (Poland)	Hydration of Cement at Elevated Temperature
Supplementary papers on the topic of the principal paper:			
	III-9	W.Wicker (German Democratic Republic)	New Methods for the Investigation of the Hydration Processes of Portland Cements

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14. General Reporter O. Henning (German Democratic Republic)			
1.	II-9	V.V. Savenkov, V.L. Chernyavsky (USSR)	Investigation of the Solubility of Calcium Hydrosilicates and Hydroaluminates in the System $\text{CaO}-\text{SiO}_2-\text{Al}_2\text{O}_3-\text{H}_2\text{O}$
2.	II-9	I.G. Grankovsky (USSR)	Formation of Disperse Structure of Mineral Binding System
3.	II-9	A. Vértes, M. Ranogajec-Komor (Hungary)	Brownmillerite Hydration by Mössbauer Spectrometry
4.	II-9	A.Osiowski, B.Wlassak (Poland)	Some Aspects of Identification of Cement Pastes Phase Composition by Infrared Absorption Spectrometry
5.	II-9	A.A. Staroselsky, A.G. Olginsky Yu.A. Spirin (USSR)	Electrokinetic Properties of Cement Stone
6.	II-9	K.E. Goryainov, A.N. Schastny, S.I. Zelenaya (USSR)	On Structural Non-Uniformity of Cement Hydration Products
7.	II-9	V.I. Shein, V.A. Krivushchenko (USSR)	Theoretical Calculation of Cement Activity
8.	II-9	G.B. Egorov (USSR)	Multidimensional Studies on Cement Properties
9.	II-9	J.E. Hasbrouck, B.L. Meyers (USA)	A Microscope Study of Cement and its Constituents
Section III. CEMENTS AND THEIR PROPERTIES			
Supplementary papers on the topic of the principal paper:			
	III-1	I.V. Kravchenko (USSR)	Rapid-Hardening and High-Strength Portland Cements

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<b>15. General Reporter S.Sprung (German Federal Republic)</b>			
1.	III-1	K.D.Nekrasov, A.P.Tarasova, N.P.Zhdanova (USSR)	Properties of Rapid-Hardening Cement on Heating
2.	III-1	A.V.Vorobey, E.Z.Zabolotsky, A.P.Dymchuk, L.N.Shorokh, A.V.Bugaichuck (USSR)	The Relationship between the Grain Composition and Characteristics of High-Strength Cements
3.	III-1	Y.T.Simeonov, G.M.Bozhinov, Zh.Kh.Zheliazkov (Bulgaria)	On Properties of Rapid-Hardening Cements
4.	III-1	J.Peukert (Poland)	Technology of Rapid-Hardening or High-Strength Cements from One Clinker
5.	III-1	K.Nakagawa, Y.Watanabe, I.Mino, T.Kitsuta (Japan)	Adoption of Electrofused Calcium Sulfoaluminate Clinker for Ultra High Strength Concrete
6.	III-1	S.Mori, H.Uchikawa, K.Tsukiyama, S.Uchida (Japan)	The Hydration of Special Super High Early Strength Cement at 5°C.
7.	III-1	Y.I.Deshko, V.I.Akunov, V.L.Pankratov, N.I.Ferens, V.P.Sheludko, G.V.Zavadsky (USSR)	Preparation of High-Strength and Rapid-Hardening Cement
		Supplementary papers on the topic of the principal paper:	
	III-2	V.I.Satarin (USSR)	Slag Portland Cement
<b>16. General Reporter R.Sersale (Italy)</b>			
1.	III-2	A.A.Govorov (USSR)	Hydrothermal Hardening of Slag Glasses Dispersions

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2.	III-2	S.D.Okorokov, L.Ya.Goldstein, K.V.Gladkykh, K.B.Freydin (USSR)	Granulated Slag Cements
3.	III-2	I.A.Kryzhanovskaya, E.E.Kiryaeva, U.L.Galchinetskaya, G.N.Karatanova (USSR)	Additions Containing Phosphorus and Fluorine in Cement Production
4.	III-2	I.S.Vylkova, R.G.Dogandzhieva (Bulgaria)	On Binding Properties of Blast-Furnace Granulated Slag with High Content of Barium and Manganese
5.	III-2	C.A.Taneja (India)	Role of Magnesia on Hydration of High Alumina Slags
6.	III-2	H.G.Smolczyk (German Federal Republic)	Slag Cements and Alkalireactive Aggregates
7.	III-2	Ya.M.Syrkin, I.A.Sibiryakova, L.P.Shatokhina (USSR)	The Significance of Grain Size Distribution in Cement Strength Formation

Supplementary papers on the topic of the principal paper:

III-3	M.Kokubu, J.Yamada (Japan)	Fly-Ash Cements
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17. General Reporter G.-I.Schmidt (German Federal Republic)

1.	III-3	Z.B.Entin, E.T.Yashina, G.G.Lepeshenkova, N.Z.Ryazantseva (USSR)	On the Hydration and Hardening of Cements with Fly-ash Addition
2.	III-3	E.A.Galibina (USSR)	The Role of Slag Glass in Shale Ash Hydraulic Activity
3.	III-3	R.Kovacs (Hungary)	Hydration Processes and Durability of Fly-Ash Cements

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4.	III-3	P.Schubert (German Federal Republic)	A Contribution on the Resistance to Sulphate Solution of Cement Mortar Prisms Containing Fly-Ash
5.	III-3	V.Kh.Kikas, E.I.Piksary, A.A.Khain, I.A.Laul (USSR)	Effective Ash Cements on the Basis of the Solid Fuel Fly-Ashes
6.	III-3	M.Kobayashi, N.Miyake, M.Kokubu (Japan)	Fly-Ash for Long-Term High-Alumina Cement Strength
7.	III-3	S.S.Rehs, S.K.Garg (India)	Production of Cement Clinker Using Fly-Ash
8.	III-3	H.P.Lühr, Ya.Efes, (German Federal Republic)	Influence of the Granulometry of Fly-Ashes with Low Ignition Losses on the Strength Development of Mortar Prisms
		Supplementary papers on the topic of the principal paper:	
	III-4	J.Talaber (Hungary)	High-Alumina Cements
<b>18. General Reporter T.D.Robson (United Kingdom)</b>			
1.	III-4	A.S.Berger, N.P.Kotsupalo, V.A.Pushnyakova (USSR)	On Metastable Equilibrium of Calcium Hydroaluminates in Solutions of Hydroxides of the Alkali Metals
2.	III-4	V.M.Nikushchenko, P.F.Rumyantsev, V.S.Khotimchenko (USSR)	On Mechanism of Interaction of Alumina Cement Minerals with Water
3.	III-4	Yu.P.Udalov, T.Yu.Chemekova, Z.S.Appen (USSR)	On the Character of the CaO-Al <sub>2</sub> O <sub>3</sub> System Diagram
4.	III-4	W.Dosch, H.Keller (German Federal Republic)	On the Crystal Chemistry of Tetracalcium Aluminate Hydrate

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5.	III-4	M.Révay (Hungary)	The Pre-Estimation of the Expected Decrease of Strength of High Alumina Cement Concretes
6.	III-4	L.A.Zakharov (USSR)	Alumina-Belite Cement
7.	III-4	A.Ruiz de Gauna, F.Triviano, T.Vazquez (Spain)	On the Carbonation Mechanism of Calcium Aluminate Hexahydrate in Hydrated High-Alumina Cement
8.	III-4	V.A.Tichonov, Z.G.Klimenko, E.T.Berezhenko, E.V.Zhavoronkova (USSR)	Special High-Ferruginous Cements
		Supplementary papers on the topic of the principal paper:	
	III-5	P.Mehta, M.Polivka (USA)	Expansive Cements
		<u>19. General Reporter K.G.Krasilnikov (USSR)</u>	
1.	III-5	T.V.Kuznetsova (USSR)	Self-Stress of Expansive Cements
2.	III-5	K.G.Krasilnikov, L.V.Nikitina, N.N.Skoblinskaya (USSR)	Physicochemistry of Cement Expansion Processes
	III-5	T.Kawano, K.Hitotsuya, T.Mori (Japan)	The Role of $\text{CaSO}_4$ in (Alite-CaO- $\text{CaSO}_4$ -Interstitial Substance) System Expansive Component For Cement
4.	III-5	V.V.Volkov, V.P.Kolyovski, Ya.D.Yanev (Bulgaria)	Effect of Activated Alumite Quartzite on Expansive Cement Properties
	III-5	S.Nagataki, Yu.Goto (Japan)	Creep Characteristics of Hardened Expansive Cement

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6.	III-5	T.Sato, K.Nakagawa, K.Hirano (Japan)	Production of Expansive Cement Clinker by Electric Furnace
7.	III-5	Yu.Yamazaki, T.Monji, K.Sugiura (Japan)	Early Age Expanding Behav- iors of Mortars and Concre- tes Using Expansive Additi- ves of $\text{CaO}-\text{CaSO}_4-4\text{CaO}\cdot3\text{Al}_2\text{O}_3$ $\text{SO}_3$ System
8.	III-5	J.Calleja, C.Del Olmo (Spain)	Expansion of Cements and Methods to Determine it
9.	III-5	K.S.Kutateladze, T.G.Gabadadze, N.G.Nergadze (USSR)	Alunite, Non-Shrinkage, Expansive and Stressing Cements. (ANS, AEC and ASC)
10.	III-5	V.I.Babushkin, L.P.Mokritskaya, S.P.Novikova, V.G.Zinov (USSR)	A Study of Physico-Chemical Processes During Hydration and Hardening of Expansive Cements

Supplementary papers on the topic  
of the principal papers:

III-6	F.Massazza (Italy)	Chemistry of Pozzolanic Additions and Mixed Ce- ments
III-7	S.M.Royak (USSR)	Oil-Well Cements

20. General Reporter A.M.Dmitriev (USSR)

1.	III-6 III-7	T.M.Berkovitch, E.A.Valyukov, O.I.Gracheva, E.S.Michalevskaya, L.N.Tkachev, G.S.Margolina, V.N.Lopatin (USSR)	Hydration and Harde- ning of Cement in Asbe- stos Cement
2.	III-6 III-7	V.S.Danyushevsky, T.I.Rataychak (USSR)	Extended Hardening of Ce- ment Structure in Hydro- thermal Conditions
3.	III-6 III-7	M.G.Tolochkova, G.P.Gerasimova (USSR)	On Hardening of Oil-Well Cements in Aggressive Media of High Mineralization

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4.	III-6 III-7	U.Costa, F.Massazza (Italy)	Factors Affecting the Reaction with Lime of Pozzolanas
5.	III-6 III-7	A.I.Bulatov <sup>x)</sup> (USSR)	Oil-Well Cements for High-Temperature Wells
Supplementary papers on the topic of the principal paper:			
	III-8	I.Teoreanu (Romania)	The Chemistry of White and Coloured Cements
<u>21. General Reporter G.Tognon (Italy)</u>			
1.	III-8	E.I.Ved, B.F.Bludov, V.K.Bocharov, N.I.Piven, E.F.Zharov, Z.S.Litvi- nova, T.A.Sidorova (USSR)	Chemistry and Technology of White Cement Prepared on the Basis of Dolomites
2.	III-8	P.I.Bezhenov, L.I.Kholopova (USSR)	Coloured Clinker Cements
3.	III-8	G.I.Chistyakov (USSR)	The Effect of Clinker Bleaching Conditions on Decorative Properties of Cements
4.	III-8	S.Chromý (Czechoslovakia)	Mechanismus of White Clinker Formation
5.	III-8	M.S.Alekperov, S.A.Fataliev (USSR)	Features of Clinker For- mation Using Particular Volcanic Rocks as Alumi- nosilicate Component
6.	III-8	A.N.Gachyan, P.P.Gaidzhurov, A.P.Zubekhin, N.V.Rotych (USSR)	Phase Composition, Struc- ture and Properties of Coloured Cements
7.	III-8	K.Dolezsai <sup>x)</sup> (Hungary)	The Effect of Colouring Metal-Oxides and Cooling Rate on the Whiteness of White Portland Cement Clinker

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Supplementary papers on the topic of the principal paper:			
	III-9	G.Idorn, Z.Fördös (Denmark)	Cement-Polymer Mate- rials
22. <u>General Reporter Yu.S.Cherkinsky (USSR)</u>			
1.	III-9	I.M.Yusufov, F.G.Suleymanov, Sh.T.Babaev (USSR)	Polymer-Cement Compositions based on IAAR and RPP Addi- tives
2.	III-9	N.A.Sokolova, V.P.Luty, N.P.Kharitonov (USSR)	Cements Based on Organo- silicon Polymers
3.	III-9	K.S.Akhmedov, F.L.Glekel, R.Z.Kopp (USSR)	On the Role of Polymeric Additives in the Processes of Cement Hardening
4.	III-9	Yu.S.Cherkinsky, G.F.Slipchenko (USSR)	Hydration Hardening of Ce- ment in Presence of Poly- mers
5.	III-9	G.M.Tarnarutsky (USSR)	The Influence of Hydropho- bic Additives on the Hydrat- ion of Portland Cement
6.	III-9	R.C. de Vekey, A.J.Majumdar (United Kingdom)	Durability of Cement Pastes Modified by Polymer Disper- sions
7.	III-9	Yo.Ohama (Japan)	Formulas of Estimating the Compressive Strength of Polymer-Modified Mortars
8.	III-9	J.Koós (Hungary)	Stability of Plastic Materi- als in Hydrated Portland Cement

x) Due to late arrival these supplementary papers were not sent to the General Reporters