

Mixture-Proportioning of Cement-based Materials Using Design Of Experiments (DOE)

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Cementation is a widely applied technique for the conditioning of low- and intermediate-level radioactive wastes. The process is relatively simple and inexpensive. However, the quality of the final cemented waste forms strongly depends on the composition of the waste and on the type of cement used. Elaborating a cement-waste formula thus requires to investigate many parameters, which results, with classical approaches, in a high number of trials. Design of experiments (DOE) is first shown to be a fruitful alternative which enables to keep the total number of runs within reason without compromising the quality of the results. Two examples are then discussed in order to illustrate how to solve some of the practical problems encountered in cement-waste formulation. The first one deals with mixture-proportioning of a grout while the second one shows how to investigate the sensitivity of a cement-waste recipe on a variation in the waste composition.