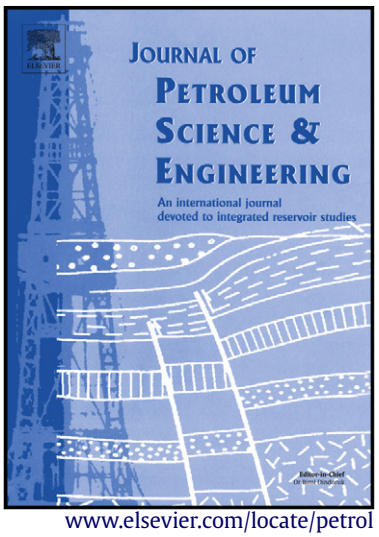

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Smart Cements and Cement Additives for Oil and Gas Operations

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Abstract

Cement materials are important not only for modern structures and buildings in expanding urban environments and mega projects, but also for a variety of industries including the oil and gas production sector, specifically in drilling and completion operations. This review features the materials and efforts to fabricate smart cements for several applications. The translation of these advances in materials and technologies in the oil and gas field can make a difference between cost and also catastrophic failure. Modalities ranging from stimuli-responsive cements capable of self-healing, self-sensing and shape changing are described herein. The use of nanomaterials ranging from nanocarbons to other technologically important nanoparticles as cement additives are also reviewed.

Keywords: cement, polymer, nanomaterials,stimuli-responsive