

# **Modelling acid attack of oilwell cement exposed to carbonated brine: effect of specimen geometry on experimental results**

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## **ABSTRACT**

In recent years, the authors and co-workers have developed a diffusion-reaction model for the degradation process of oilwell cements exposed to carbonated brines in the context of CO<sub>2</sub> capture and storage in abandoned oil reservoirs [1]. The model considers two main diffusion/reaction field variables for the concentrations of aqueous calcium and carbon species in the pore solution of the hardened cement paste, complemented by two diffusion-only field variables for chloride and alkalis concentrations. The volume fractions of solid constituents evolve according to the chemical kinetics and chemical equilibrium equations of the reactions involved, determining the diffusivity properties of the material. In this paper, in the framework of an experimental campaign in preparation, this model is used for assessing the effect of different specimen geometries on the kinetics and extent of the acid attack. The results obtained will help to optimize the experimental setup and to the interpretation of the results obtained.

## **REFERENCES**

- [1] J. Liaudat, A. Martínez, C. M. López, & I., Carol. Modelling acid attack of oilwell cement exposed to carbonated brine. *International journal of greenhouse gas control*, **68**, 191-202 (2018)