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Structural stability in synthetic rocks and metallic foams under reservoir conditions

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In this talk, experimental results of structural stability of synthetic rocks and metal foams[1] subjected to reservoir conditions are presented. By controlling the injection of water and mineral oils ona confinement cell, the samples are subjected to conditions of high pressure (25KPSI) and high temperature (200℃). By means of micrography techniques the mechanical deformation of foam layers are characterized. The theoretical and experimental study of permeability and porosity in synthetic media has been studied at low pressures [2,3]. However, in this work we are interested in reproducing conditions close to those of exploration and perforation for geothermal and petro physics procedures. We compare the deformation suffered by metallic aluminum foams, with the behavior of synthetic porous rocks manufactured with glass spheres. Through the theoretical model of Ahmadi [4] we predict the permeability behavior in our samples. To do this we adjusted this theoretical model, taking into account the predictions of porosity and tortuosity proposed for the type of sphere used in our synthetic rocks and foams, as well as the constants of the Kozeny-Carman model [5,6]. The results of our case studies are shown and stability applications are established in studies for exploration and drilling of deposits.

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