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Poroelastic properties on metal foams submitted to high pressure

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The metallic foams are a novel possibility to impact significantly the design of materials taking into account the wide technological applications [1,2]. In this work the procedure to manufacture metallic foams with controlled porosity is presented. A high pressure cell is used to submit the metallic foams to reservoir conditions, which imply high pressures and high temperatures. The injection of the optimal fluid in metallic foams increase the pore pressure which induces a dilation of the foam [3]. These effects are described with poroelastic deformation quantities. The porous deformation is directly measured by image analysis and the well-known mechanical properties are calculated based in basic theoretical models. The aim of the present work is describe the poroelastic behavior of metallic foams [4] when they are submitted in reservoir conditions. The permeability and porosity are measured experimentally and the Carman-Kozeny [5] model is used to model our results. Our experimental results indicate that metallic foams poses high structural stability even if they are mechanically perturbed.

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