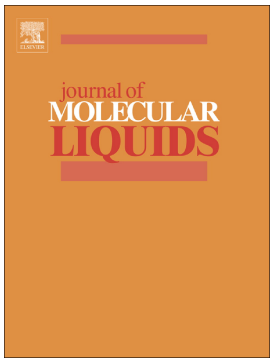


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# Fractal Characterization of Dynamic Structure of Foam Transport in Porous Media

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## Abstract

The evaluation and simulation of foam fluid are still matters of significant debate despite the large number of available studies due to the excellent properties of foam and its successful applications, especially in oil and gas field development. The properties of foam fluid are substantially determined by its dynamic structure in porous media; however only a few studies that investigate and perform measurements related to such structure have been reported. In this research, a new method based on fractal theory is proposed for evaluation of aqueous foam in porous media. As a first step, the fractal characteristics of foam in porous media are confirmed by image processing and calculations. Accordingly, the foam dynamic structure is quantitatively studied by defining and calculating the foam fractal dimension. Secondly, a concise relation is established which reveals that the foam fractal dimension is nearly time-independent. Finally, a sensitivity analysis is carried out by discussing three major factors affecting foam structure in porous media. These results are expected to be helpful for further understanding the dynamic characteristics of foam fluids and their advanced applications.

**Keywords**: Foam Fluid; Fractal theory; Dynamic Structure; Porous Media; Image Processing;