

Gas replacement in clathrate hydrates during CO₂ injection - Kinetics and micro-structural mechanism

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Abstract

The replacement process in of pure sl methane clathrate powders exposed to CO₂ have been quantitatively followed by means of neutron diffraction at conditions relevant to sedimentary matrixes of continental margins. The exchange of methane with CO₂ within a crystalline lattice of gas hydrates is seen as a two-step process of (1) a fast interfacial reaction (2) followed by much slower diffusion-limited transport. Copyright © 2013 by The International Society of Offshore and Polar Engineers (ISOPE).

Keywords

Clathrate hydrate, CO₂ sequestration, Gas replacement, Shrinking core