A MODEL TO JUDGE AGGLOMERATION AND FLOW ASSURANCE OF HYDRATES IN PIPELINES

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ABSTRACT

Risk management and flow assurance of hydrate in pipeline have been accepted more and more widely throughout the world because oil fields in ever-increasing unusual environments have been brought in production. The forces among hydrate particles while flowing in pipeline were studied thoroughly, in which the hydrate particles are supposed as spheres with a same diameter. Based on the main forces deciding the agglomeration of hydrate particles, a non-dimensional parameter, which is defined as the ratio of kinetic energy and separating energy of the hydrate particles in pipeline and shows the agglomerating probability of hydrate particles in pipeline, was proposed. Moreover, a safe model to judge the safely flow hydrate slurries was presented with the help of the new proposed non-dimensional parameter and verified with the experimental data, which shows that the model is effective to judge if the pipeline can be run safely or not.

Key words: Hydrate slurry; Flow assurance; Agglomeration; Safe model

NOMENCLATURE

\( C_h \) ratio of kinetic energy and separating energy of the hydrate particles in a unit volume

\( D \quad \text{pipe diameter [mm]} \)

\( d_p \quad \text{hydrate particle diameter [mm]} \)

\( E_h \quad \text{energy to separate the hydrate particles in a unit volume [J]} \)

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