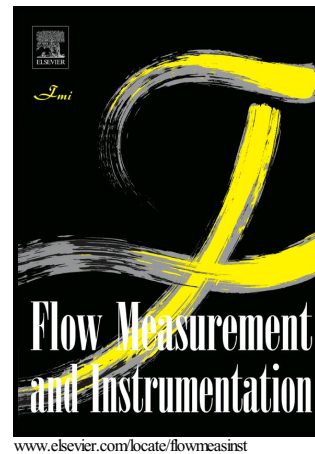


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Determination of oil-water volume fraction by using a pencil-beam collimated gamma-ray emitting source in a homogenized flow regime condition

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Abstract

The application of TPFHL as a novel two-phase flow Homogenizer loop in conjunction with the gamma-ray attenuation technique is emphasized. The capability of this instrumentation, to measure the volume fraction of iron ore powder-water two-phase mixture was demonstrated. In moving towards achieving the ability to use the above facility for two-phase mixtures with low density difference between phases, Monte Carlo (MC) simulations carried out to get the good geometry condition regarding to pencil-beam collimators used both for gamma-ray source and scintillation detector opposed it. Why of different types of oil compositions, it was used Normal-Decane (ND) as a good as well as a standard alternative to replace oil in oil-water experiments. In the following an optimum distance between a radioactive source and detector was achieved, which resulted in the maximum permissible accuracy for ND-water volume fraction measurements. Finally, different volume fractions of ND-water mixture were prepared and the corresponding fractions to each one were calculated.

Graphical abstract

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