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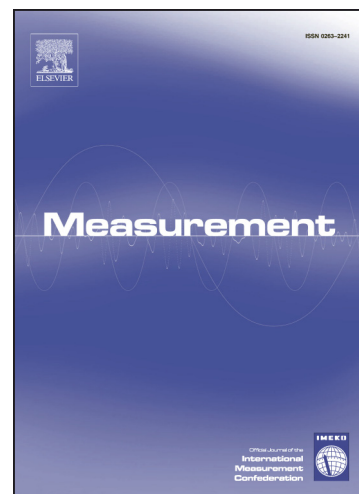
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Characterization of Moisture Distribution in a Fluidized bed

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Abstract

The determination of moisture distribution in a sample of wet solids is important as it can provide information on how well a liquid reagent has been sprayed in a fluidized bed reactor. The moisture is divided into three groups: (i) free moisture, or water coating individual particles; (ii) micro-agglomerates, which are fluidized; and (iii) macro-agglomerates, which are too large to remain fluidized and, consequently, settle to the bottom of the bed. This study evaluates various methods for the determination of the moisture distribution in a sample of wet solids, such as funnel flow, angle of repose, compressibility index, avalanche tests and electrical conductance. In addition, a different method is implemented to obtain directly the moisture distribution from the bed fluidization quality, based on image processing and on the variation with time of the conductance of the de-fluidized bed after a liquid injection.

A solids sample was taken from the fluidized bed. Its free moisture was estimated through the abovementioned tests and its overall moisture was used to obtain the fraction of water trapped in micro-agglomerates. The amount of water in the macro-agglomerates was then obtained by subtracting the measured free and micro-agglomerates moistures from the total mass of liquid injected into the bed.

Keywords: Fluidization; Liquid injection; Moisture distribution; Conductance

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