

Overview of Electrostatic Charging in Gas-Solid Fluidized Beds

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Abstract— Chemical industry involving gas-solid fluidized bed reactors has faced challenges associated to electrostatic charging for decades. Examples of such industries include petrochemical, and oil and gas. In gas-solid fluidized beds, the generation of electrostatic charges is almost unavoidable due to the repeated particle-particle and particle-reactor wall contacts and separations, resulting in some cases a high degree of contact charging. The negative consequences of bed electrification include particle agglomeration and reactor wall fouling. Much research has been conducted over the years to gain a better understanding of the charging mechanisms involved in such systems, to determine means of charge quantification, and ultimately discovering ways to eliminate or reduce this phenomenon. However, the problem still persists in commercial operations. Therefore, further research is required to assist in reaching the ultimate goal of reducing fluidized bed electrification. The drawbacks of electrostatic phenomenon in gas-solid fluidized beds, with more focus on research undertaken in understanding this occurrence and methods applied for its quantification, and the direction of the future research will be presented.