Development, construction and evaluation of electric charges sensors to determine the average velocity of the particles in the return column of a circulating fluidized bed

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Abstract
Circulating fluidized beds (LFC) are equipment very important in many industrial processes such as combustion, gasification, among others. The determination of average speed and the concentration of particles in the LFC return column allows to obtain the mass flow of recirculated solids, important parameter for process analysis and control of operating conditions of the equipment. The purpose of this work is to design, build, install and evaluate an electric charges’ sensor to determine the average velocity of the particles in the return column of a circulating fluidized bed operating cold in laboratory scale.
Key words: electric charges’ sensor, circulating fluidized bed, particles’ speed.

Introduction
The development of the research was carried out through literature review involving basic concepts in fluidization, characterization of solid particles, methods for measuring the average speed of solids, and electric charges sensors. Then the design stage, and installation of an electric charges’ sensor and finally were carried out experimental tests for evaluation of the measurement system was conducted.

Results and Discussion
Figure 1 shows the signals obtained by reading the bed and the cross-correlation thereof.
Figure 2 shows the electric charges’ sensor system composed of the LFC (1), the Faraday Cage (2), the transducer (3), the data acquisition system (4) and the computer for data analysis (5).

Conclusions
The realization of this scientific research work allowed me to learn how to design and build an electric charges’ sensor and a Faraday Cage. In addition, I had the opportunity to learn to program in LabView.

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