The rheological behavior of fluidized beds has been an object of study ever since their first technological use in the 1940’s.

Recently Anton Paar released the Powder Cell for MCR Rheometers, this device is capable of high performance measurements with large ranges of shear rate and shear stress, as well as oscillation measurements for the first time in gas-fluidized beds. The closed nature of the cell makes even hazardous substances as well as sub-micron particles accessible in this fashion. Being able to measure extremely small torques (+− 10 nNm) in a reproducible manner enables a proper rheological study of fluidized beds in the style of complex fluids.

Unsurprisingly the behavior of fluidized beds mirrors that of complex fluids (e.g. suspensions) in some regards, while still showing a large influence of the particulate matter itself but also presenting wholly unique phenomena.

Among these is a characteristic shear rate at which the normally shear thinning behaviour of a fluidized bed is changed to a shear thickening behaviour at all fluidization velocities