**Fluidization of non-spherical particle beds with viscoelastic fluids**

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In this contribution, the results are summarized of our extensive experimental investigation of expansion of non-spherical particle beds fluidized with non-Newtonian liquids of different measure of pseudoplasticity and elasticity. The experiments were performed in columns with circular and rectangular cross-sections. The beds were composed of nearly uniform ceramic cylinders, ceramic square prisms, plastic cubes, and 3 types of glass polyhedrons. The test liquids were aqueous solution of glycerol and polyalkylene glycols Emkarox HV 45 (Newtonian fluids), solutions of hydroxyethyl-cellulose Natrosol 250 HHX, Natrosol 250 HHR, and Natrosol 250 MR, solutions of carboxymethyl-cellulose BDH (high viscosity), and solution of polyacrylamides Praestol 2935 and Separan AP 45.

It was confirmed that the rheological behaviour of liquids influences the bed expansion course by a similar way as in the case of spherical particle bed fluidization.

In the fluidization with viscoelastic polymer solutions in creeping flow region, the state of particulate fluidization is not stable; with increasing liquid flow rate, the remarkable particle concentration inhomogeneities create in the bed. In dependence on degree of liquid non-Newtonian anomaly, the measure of the bed expansion reduces due to above-mentioned phenomenon. On approval, the structures of beds of cylindrical particles fluidized with 92 % solution of glycerol, (a), pseudoplastic and partly elastic 0.6 % solution of Natrosol HHR, (b), and with strongly pseudo-plastic and elastic 0.5% solution of Praestol, (c), in the column of rectangular cross-section are for the ratio of superficial liquid velocity and particle terminal velocity $u/u_t = 0.1$ compared in Fig. 1.

The influence of elasticity on the expansion weakens with the increasing Reynolds number. When a critical value of the Reynolds number, which depends on degree of liquid elasticity, is exceeded, the bed expansion course is identical with that for fluidization with purely viscous fluids.

The relationships based on the Carreau viscosity model have been proposed for description of fluidization with viscoelastic polymer solutions in the both creeping and transition flow regions. It has also been verified that the relationships expressed in terms of particle terminal falling velocity and proposed formerly for prediction of minimum fluidization velocity of spherical particle beds can be used for engineering estimation of minimum fluidization velocity of non-spherical particle beds as well, if the volume equivalent diameter of non-spherical particle is substituted for the sphere diameter.