

## Theoretical and Experimental Study of Microchannel Blockage Phenomena

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Microchannel blockage phenomena by hard, spherical particles have been investigated. Statistical data of the blockage in straight cylindrical glass channel were taken over a range of particle-to-channel diameter ratio of  $0.14 < R < 0.65$  at  $7.8 < Re < 16.3$ . The visualization of particle motion was also performed. The experimentally obtained values of critical particle concentration for the blockage ( $\phi_c$ ) are surprisingly low, however dependency to  $R$  at constant average shear rate ( $\bar{G}$ ) has been successfully predicted by the modified orthokinetic flocculation theory for the channel. It failed to predict the strong negative relation between  $\phi_c$  and  $\bar{G}$ . Since the theory is adequate to estimate collision frequency of the particle at initial stage of the flocculation, the result indicates significant effect of  $\bar{G}$  on following arch formation process. It also suggests that the forming of larger aggregate could be skipped by counting possibility of individual particle or the small aggregation come together to form the arch simultaneously.

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