

Study on micromixing and reaction process in a rotating bed

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Summary

The exploration on the microscale transport phenomena in RPB is of significance to understand the mechanism of microscale mixing and chemical reaction therein. On the basis of previous studies, numerical simulation is carried out and the numerical results are compared with the experimental results in this paper to indirectly determine the thickness of the liquid film. Appropriate modification on the rotational component of the velocity of the liquid film is proposed and the numerical result is in reasonable agreement with the experimental result. The fluid flow and the species transfer with a parallel reaction are studied to obtain the evolution of the segregation index, the turbulence dissipation rate and the micromixing time with the rotational speed. It is evidenced that there exists different regions of micromixing at different rotating speed, ie. a clear fractal phenomenon is clarified. It can be deduced as Two-Region Theory and advances the understanding of the micromixing in RPB and will provide a solid base for further study.

