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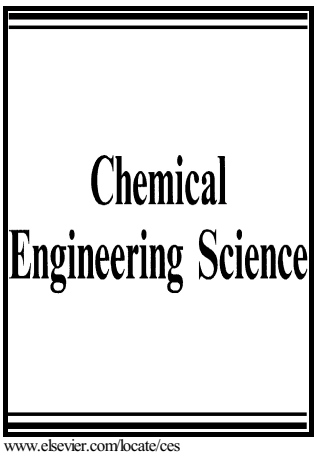

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Mixing and axial dispersion in Taylor-Couette flows: the effect of the flow regime.

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Abstract

The paper focuses on mixing properties of different Taylor-Couette flow regimes and their consequence on axial dispersion of a passive tracer. A joint approach, relying both on targeted experiments and numerical simulations, has been used to investigate the interaction between the flow characteristics and local or global properties of mixing.

Hence, the flow and mixing have been characterized by means of flow visualization and simultaneous PIV (Particle Imaging Velocimetry) and PLIF (Planar Laser Induced Fluorescence) measurements, whereas the axial dispersion coefficient evolving along the successive flow states was investigated thanks to dye Residence Time Distribution measurements (RTD). The experimental results were complemented, for each flow pattern, by Direct Numerical Simulations (DNS), allowing access to 3D information. Both experimental and numerical results have been compared and confirmed the significant effect of the flow structure (axial wavelength of Taylor vortices and azimuthal wavenumber) on axial dispersion.

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