

Abstract Submitted  
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**Studies on two-phase ionic liquid-aqueous flows in small channels of various sizes** DIMITRIOS TSAOULIDIS, MAXIME CHINAUD, QI LI, PANAGIOTA ANGELI, Chemical Engineering Department, University College London, Torrington Place, WC1E 7JE, London, UK, UNIVERSITY COLLEGE LONDON TEAM — Two-phase flows in intensified small-scale systems find increasing applications in (bio)chemical analysis and synthesis, fuel cells, polymerisation, and separation processes (solvent extraction). Ionic liquids are emerging as a useful chemical in different areas of interest because of their unique properties such as negligible volatility and flammability, and good thermal and radiation stability. In this work, the hydrodynamic characteristics during plug flow have been investigated in detail. Experiments were carried out in Teflon channels of different sizes, i.e. 0.5, 1, and 2 mm internal diameter using two-phase systems relevant to spent nuclear fuel reprocessing, i.e. TBP/ionic liquid (30%, v/v)-nitric acid solutions. Important mixing characteristics and circulation patterns within the aqueous plugs have been studied by means of Particle Image Velocimetry (PIV). Finally, the mechanism of plug flow formation and the resulting plug size were investigated using Computational Fluid Dynamic (CFD).

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