Author(s): Ferreira, AJ (Ferreira, A. J.); Cruz, C (Cruz, C.); Godinho, MH (Godinho, M. H.); Kulkarni, PS (Kulkarni, P. S.); Afonso, CAM (Afonso, C. A. M.); Teixeira, PIC (Teixeira, P. I. C.)

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Abstract: In a recent paper we reported an experimental study of two N-alkylimidazolium salts. These ionic compounds exhibit liquid crystalline behaviour with melting points above 50 degrees C in bulk. However, if they are sheared, a (possibly non-equilibrium) lamellar phase forms at room temperature. Upon shearing a thin film of the material between microscope slides, textures were observed that are strikingly similar to liquid (wet) foams. The images obtained from polarising optical microscopy (POM) were found to share many of the known quantitative properties of a two-dimensional foam coarsening process. Here we report an experimental study of this foam using a shearing system coupled with POM. The structure and evolution of the foam are investigated through the image analysis of time sequences of micrographs obtained for well-controlled sets of physical parameters (sample thickness, shear rate and temperature). In particular, we find that there is a threshold shear rate below which no foam can form. Above this threshold, a steady-state foam pattern is obtained where the mean cell area generally decreases with increasing shear rate. Furthermore, the steady-state internal cell angles and distribution of the cell number of sides deviate from their equilibrium (i.e. zero-shear) values.

Addresses: [Teixeira, P. I. C.] Inst Super Engn Lisboa, P-1950062 Lisbon, Portugal; [Teixeira, P. I. C.] Univ Lisbon, Ctr Fis Teor & Computac, P-1649003 Lisbon, Portugal; [Ferreira, A. J.; Cruz, C.] Univ Lisbon, Ctr Fis Mat Condensada, P-1649003 Lisbon, Portugal; [Cruz, C.] Univ Tecn Lisbon, Dept Fis, Inst Super Tecn, P-1040001 Lisbon, Portugal; [Godinho, M. H.] Univ Nova Lisboa, Dept Ciencia Mat, P-2829516 Caparica, Portugal; [Godinho, M. H.] Univ Nova Lisboa, CENIMAT I3N, Fac Ciencias & Tecnol, P-2829516 Caparica, Portugal; [Kulkarni, P. S.] Univ Nova Lisboa, REQUIMTE, Dept Quim, Fac Ciencias & Tecnol, P-2829516 Caparica, Portugal; [Kulkarni, P. S.; Afonso, C. A. M.] Univ Tecn Lisbon, CQFM, P-1040001 Lisbon, Portugal; [Kulkarni, P. S.; Afonso, C. A. M.] Univ Tecn Lisbon, Inst Nanosci & Nanotechnol, Inst Super Tecn, P-1040001 Lisbon, Portugal

Reprint Address: Teixeira, PIC, Inst Super Engn Lisboa, Rua Conselheiro Emidio Navarro 1, P-1950062 Lisbon, Portugal.

E-mail Address: piteixeira@cii.fc.ul.pt

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