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Fabrication and Properties of polyacrylic acid by ionic surfactant disturbance method

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The formation of polymeric materials can be achieved by several methods such as melting and casting, screw extrusion, cross-linking of resin or rubber in a mold, and so on. In this work, the polyacrylic acid is formed by using the emulsion disturbance method. Despite extensively used in the colour painting and coating industries, acrylic emulsion can be processed into a foam and powder configuration by a reaction between acrylic emulsion and salt. The solidification hardly changes the volume between liquid emulsion and solidified polymer which means the final structure of polyacrylic acid is filled with opened air cells. The opened air cell structure is confirmed by the result from scanning electron microscopy. The chemical analysis and crystallography of acrylic powder and foam are examined by Fourier-transform infrared spectroscopy and X-ray diffraction respectively. The phase transformation and stabilization are studied by differential scanning calorimetry and thermo gravimetric analysis. Moreover, the mechanical properties of acrylic foam were observed by tensile, compressive and hardness test. In addition to the basic property analysis, acrylic foam was also used in the particle filtration application.

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