SCHOLARLY PUBLICATIONS
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Journal Name: Journal of Colloid and Interface Science **IF: 9.6**

Title: Field-induced tubular assembly of ionic microgels: Evidence for shape anisotropy from small-angle neutron scattering studies

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Details: Volume-724, 15th December, 2026

Abstract: We report the AC electric field-induced directed assembly of 10 mol% crosslinked ionic microgels at various effective volume fractions, investigated using confocal microscopy and small-angle neutron scattering. At low effective volume fractions, in an electric field, the microgels form strings, tubes, and islands of body-centered-tetragonal structures. While tubular structures have previously been reported for intrinsically anisotropic particles such as ellipsoids or bowl-shaped colloids, analogous assemblies have not been observed for initially isotropic hard or soft particles. Small-angle neutron scattering experiments under the so-called zero-average contrast conditions were carried out to obtain the single-particle size and structure as the microgels align along the direction of the field. The P(r) analysis of the small-angle neutron scattering data reveals a clear signature of elongated ellipsoidal particles. A fuzzy-ellipsoid model was thus employed to fit the data, yielding aspect ratios ranging from 1.93 to 2.46 depending on the field strength and effective volume fraction. We therefore propose that the tubular assemblies observed at low effective volume fractions arise from field-induced shape anisotropy of the microgels. Our results demonstrate how external electric fields can dynamically induce particle anisotropy in initially spherical soft colloids, thereby enabling the formation of new self-assembled structures that are typically associated with anisotropic building blocks. We discuss the experimental phase diagram and compare our observations to the theoretical phase diagram for soft dipolar spheres.

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Journal Name: Hydrometallurgy **IF: 6.3**

Title: Extraction and recovery of V (V) from citrate leachate of spent catalyst containing impurities (Mg and Fe) using tricapryl methyl ammonium chloride

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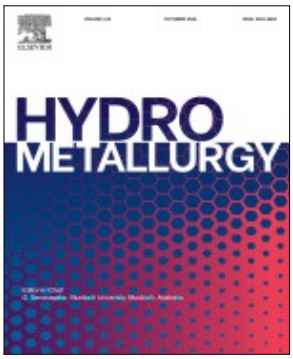
Details: Volume-244, October 2026

Abstract: A systematic investigation was carried out for the selective extraction and recovery of vanadium from a citric acid-mediated leach liquor of spent catalyst using a mixture of Aliquat 336 and 2-Octanol. Prior to extraction, iron was efficiently removed at pH_e 4.0 via slaked lime precipitation. Extraction equilibrium studies indicated that vanadium was predominantly extracted as the $[VO(C_6H_5O_7)]^{2-}$ anionic complex by Tricarpyl methyl Ammonium Chloride (Aliquat 336). The association of 2 mol of aliquat 336 was confirmed from the slope analysis method with extraction of vanadium from citrate media as$CH_3R_3N_2VOC_6H_5O_7$]org. Vanadium extraction was quantitative under conditions of pH 6.0 ensuring no co-extraction of magnesium. Extraction isotherm examined using 0.6 M Aliquat 336 + 10% (v/v) 2-octanol at A: O = 8:1 in two stages leading to attaining 5 folds enrichment of vanadium during extraction. FTIR analysis confirmed the successful coordination of vanadium in the organic phase. Stripping of vanadium using NaOH at an aqueous-to-organic (A:O) ratio of 1:5 yielded a concentrated strip solution containing 47.2 g/L vanadium, representing almost eightfold enrichment compared to the initial leachate. Final precipitation and calcination of the strip solution produced high-purity V_2O_5, confirmed by XRD analysis. This study demonstrates a clean, efficient, and environmentally benign method for the selective recovery of vanadium from spent catalyst leachates using ionic liquid-based solvent extraction.



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