

Tao, K., Adler-Abramovich, L., Gazit, E. Controllable Phase Separation by Boc-modified lipophilic acid as a multifunctional extractant. *Sci. Rep.*; 2015: 5, 17509 (Multidisciplinary Sciences, 5/57, Q1, IF 5.578, citations 0)

**Abstract:** While phase separation of immiscible liquid-liquid systems has become increasingly significant in diverse areas, the irreversible nature limits their further application in controllable extraction-concentration or capture-release fields. There is a need for the development of simple, efficient and reversible methods for numerous research and industrial extraction and separation applications. We envisioned Boc-modified lipophilic acids as a simple model for such use based on the studies of the multi-phase transitions of Boc-modified supramolecular polymeric systems. Here, we demonstrate that in the presence of Boc-7-aminoheptanoic acid (Boc-7), phase separation occurs in mixtures of miscible organic solvent and water. The separation behavior was confirmed by differential colorimetric development in aqueous and organic phases using methyl orange staining assays. Component substitution experiments verified that the phase separation results from the subtle balance between the aggregation and the solvation forces of Boc-7, and is reversible by adjusting the solution pH. Owing to the intrinsic hydrophobic properties of the organic phase and the hydrogen bonding-forming ability of the carboxyl group of Boc-7, the phase separation system captures and releases Sudan Red, fluorescein, and streptavidin in a controllable manner. Consequently, a reversible and simple phase separation system can be designed as a multifunctional extractant.