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Self Assembly of Mixed-Valence Ionic Amphiphiles into Faceted Vesicles MEGAN GREENFIELD, GRAZIANO VERNIZZI, LIAM PALMER, SAMUEL STUPP, MONICA OLVERA DE LA CRUZ, Northwestern University —
We show that anionic and cationic amphiphiles of unequal charge can co-assemble into small faceted vesicles and we propose a theoretical model to explain the faceting behavior. The strong electrostatic interaction between the +3 and -1 head groups increases the Columbic cohesion energy of the amphiphiles and should favor the formation of a two-dimensional, flat ionic surface. The vesicle surface can form edges by breaking the ionic lattice, which can be visualized as faceted shapes. Our results demonstrate that a large charge imbalance between the cationic and anionic head groups of amphiphiles enables their coassembly into facetted vesicles. We anticipate this work to be a starting point for rationally designing new self-assembled supramolecular structures.

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