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**Coacervate Core Micelles for the Dispersion and Stabilization of Organophosphate Hydrolase in Organic Solvents.** CAROLYN MILLS, ALLIE OBERMEYER, XUEHUI DONG, BRADLEY D. OLSEN, Massachusetts Institute of Technology — Bulk organophosphate (OP) nerve agents are difficult to decontaminate on site and dangerous to transport. The organophosphate hydrolase (OPH) enzyme is an efficient catalyst for hydrolyzing, and thus decontaminating, these compounds, but suffers from poor stability in the hydrophobic bulk OP environment. Here, we exploit the complex coacervation phase separation phenomenon to form complex coacervate core micelles (C3Ms) that can protect this OPH enzyme under these conditions. Stable C3Ms form when mixing a charged-neutral block copolymer methyl-quaternized poly(4-vinylpyridine)-*block*-poly(oligo(ethylene glycol) methacrylate) (Qp4vp-*b*-POEGMA), a homopolymer poly(acrylic acid) (PAA), and OPH under a certain conditions. The C3Ms are then transferred into two organic solvents, ethanol and dimethyl methylphosphonate (DMMP), which is a good simulant for the physical properties of the OP compounds. The C3Ms retain their nanostructures in the organic solvents. The activity test of OPH indicates that the C3Ms successfully protect OPH activity in organic solvents.

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