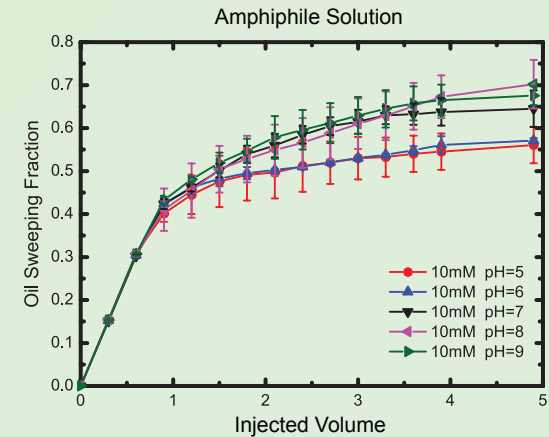
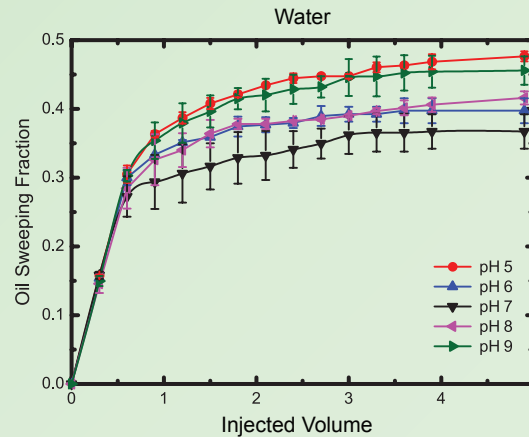
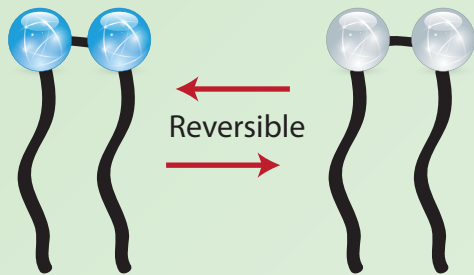
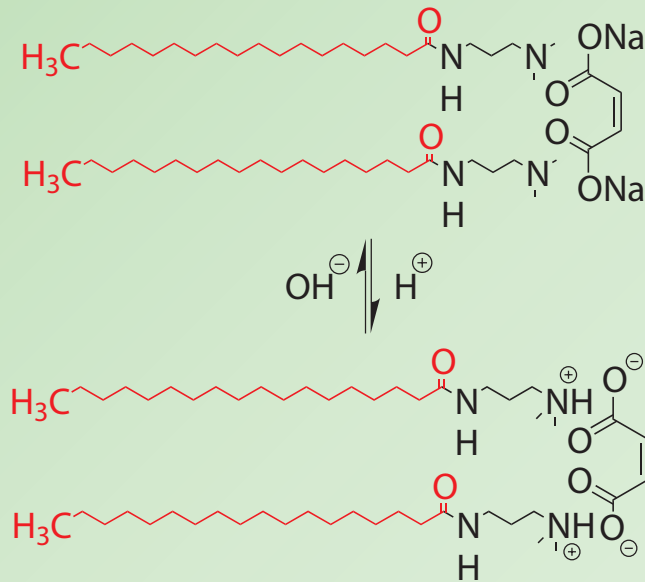
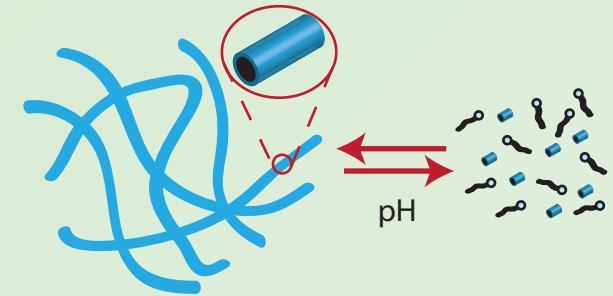
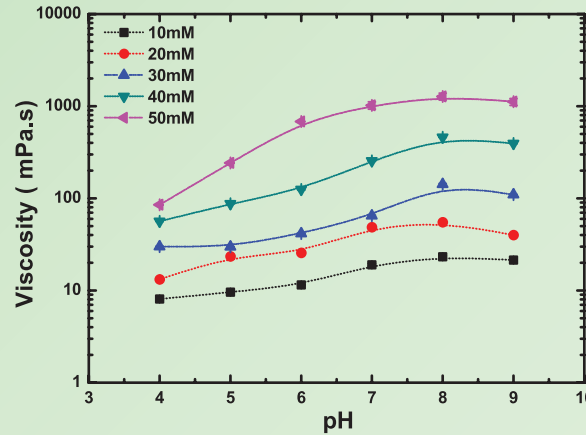


Adaptable and Smart Amphiphilic Systems in Enhanced Oil Recovery

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We developed a novel pH-switchable amphiphilic system. The viscosity of the amphiphile solution is switchable via tuning the pH through the addition of acid or base. Such a system possesses the characteristics of a facile, rapid, cost-effective reversible process and recyclable cheaper materials.



The two key benefits of the developed amphiphiles to the EOR are: (i) each oil reservoir generally has different characteristics in terms of its permeability, porosity, crude-oil type, temperature, and water composition. Thus, each requires a different level of tuning in viscosity and interfacial tension. The use of adaptable amphiphiles can alleviate the need to synthesize a different surfactant system for each oil reservoir; and (ii) one way to minimize the energy cost of pumping down flooding water for sweeping oil away is to control the viscosity of the water. Since it is easier to pump down less viscous water, it is desirable to begin EOR with a low viscosity, increase viscosity when sweeping is needed, and decrease viscosity after the sweeping has been carried out. Using novel amphiphiles shown here, such control over the viscosity of water can be achieved by simply adding small amounts of acid and base to the amphiphile solution.