

## Preparation of Cationic Mixed-Mode Acrylamide-Based Monolithic Stationary Phases for Capillary Electrochromatography

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**ABSTRACT:** A series of amphiphilic macroporous mixed-mode acrylamide-based continuous beds bearing positively charged quaternary ammonium groups is synthesized for capillary electrochromatography (CEC) under variation of the concentration of the cationic monomer in the polymerization mixture. Positively charged mixed-mode monolithic stationary phases are synthesized in pre-treated fused silica capillaries of 100  $\mu\text{m}$  I.D via single step free radical copolymerization of cyclodextrin-solubilized *N-tert*-butylacrylamide, a hydrophilic crosslinker (piperazine diacrylamide), a hydrophilic neutral monomer (methacrylamide), and a positively charged monomer ([2-(methacryloyloxy)ethyl]trimethyl ammonium methyl sulfate) in aqueous solution containing the lyotropic salt ammonium sulfate as a pore-forming agent. The synthesized monolithic stationary phases contain hydrophobic, hydrophilic, and charged functionalities. They can be employed for the CEC separations of different classes of neutral and charged solutes (with varied polarity) in the reversed-phase mode, in the normal-phase mode, in the ion-exchange mode, in a mixed-mode, or in the hydrophilic interaction liquid chromatography (HILIC) mode. The influence of the concentration of the cationic monomer in the polymerization mixture on retention factor, electroosmotic mobility, and methylene selectivity ( $\alpha_{\text{meth}}$ ) is studied under isocratic conditions for alkylphenones in the reversed-phase mode by capillary electrochromatography (CEC). Scanning electron microscopy (SEM) micrographs demonstrate that the morphology of the synthesized monoliths (i.e., the domain size) is strongly influenced by the variation of the concentration of the cationic monomer in the polymerization mixture.