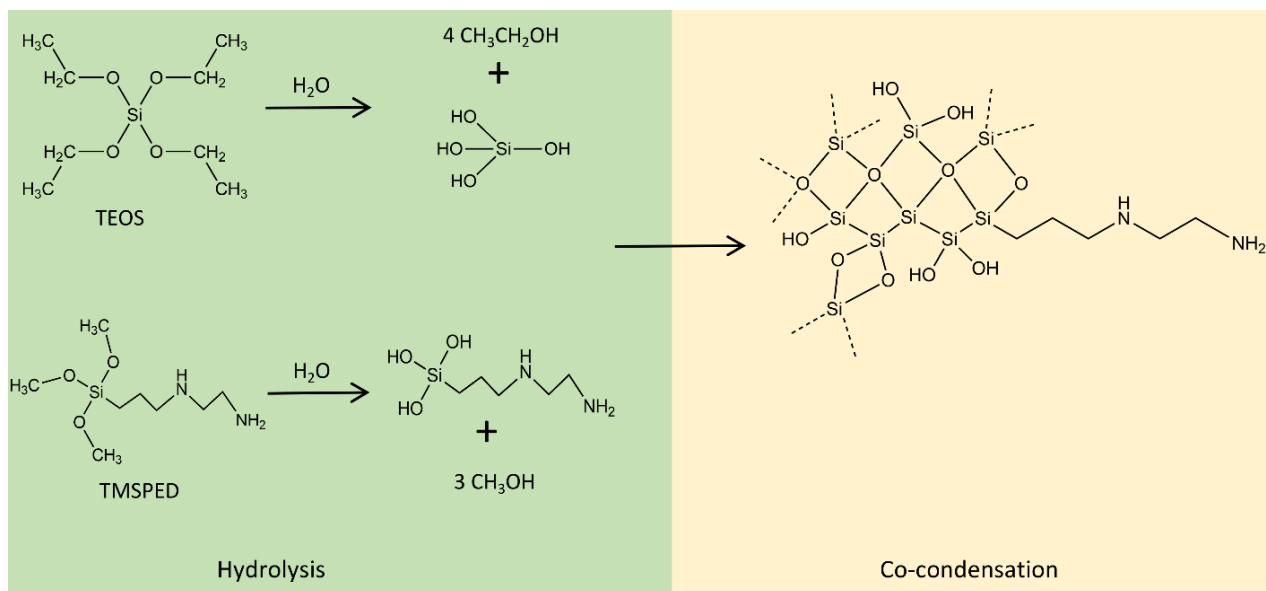
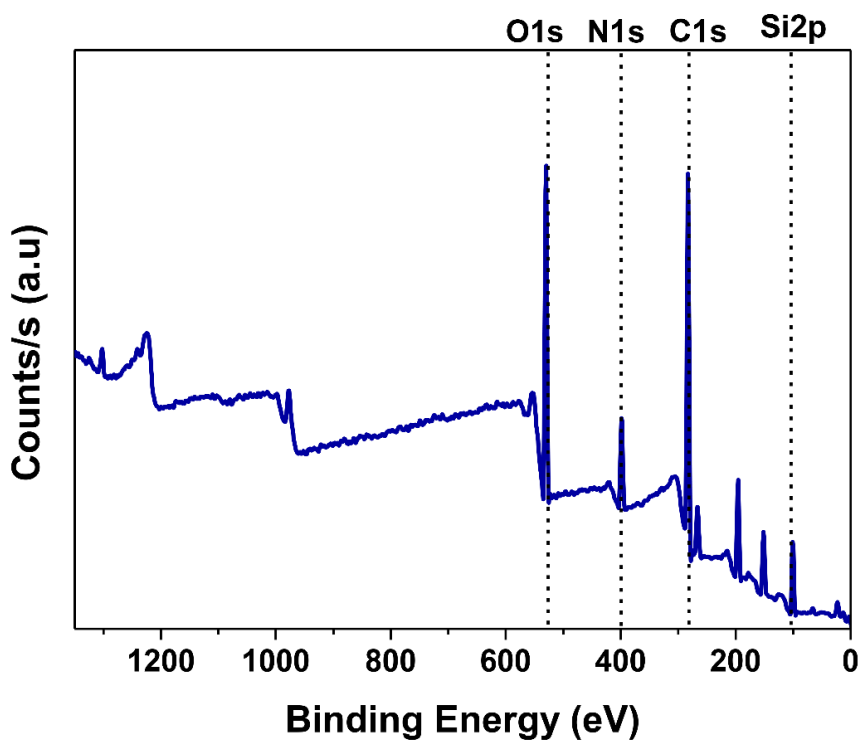


## Electrospun amine-functionalized silica nanoparticles - cellulose acetate nanofiber membranes for effective removal of hardness and heavy metals (As(V), Cd(II), Pb(II)) in drinking water sources



**Reaction scheme S1:** Hydrolysis and co-condensation of TEOS and TMSPED to form the AMS network



**Figure S1:** XPS Survey spectra of AMS Nps

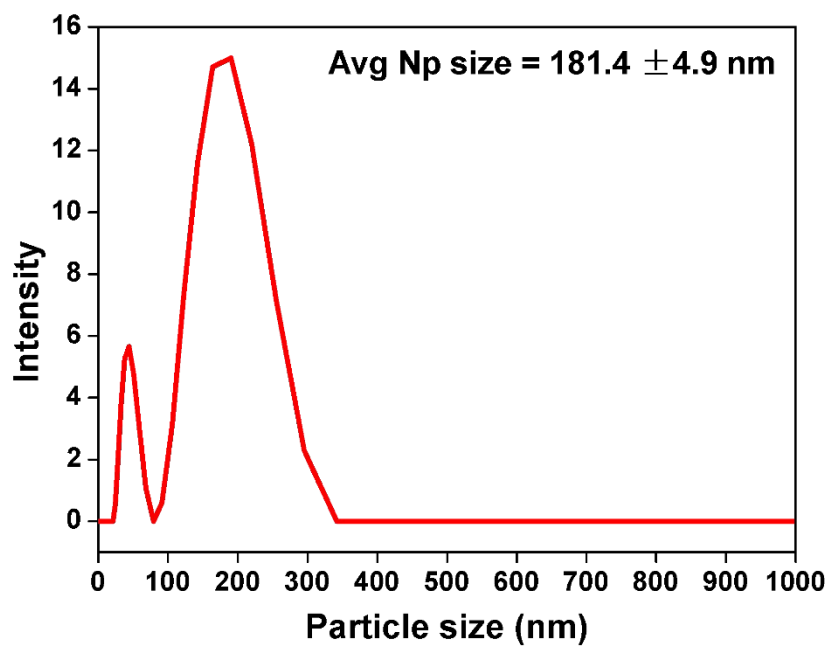


Figure S2: DLS particle size profile of AMS Nps

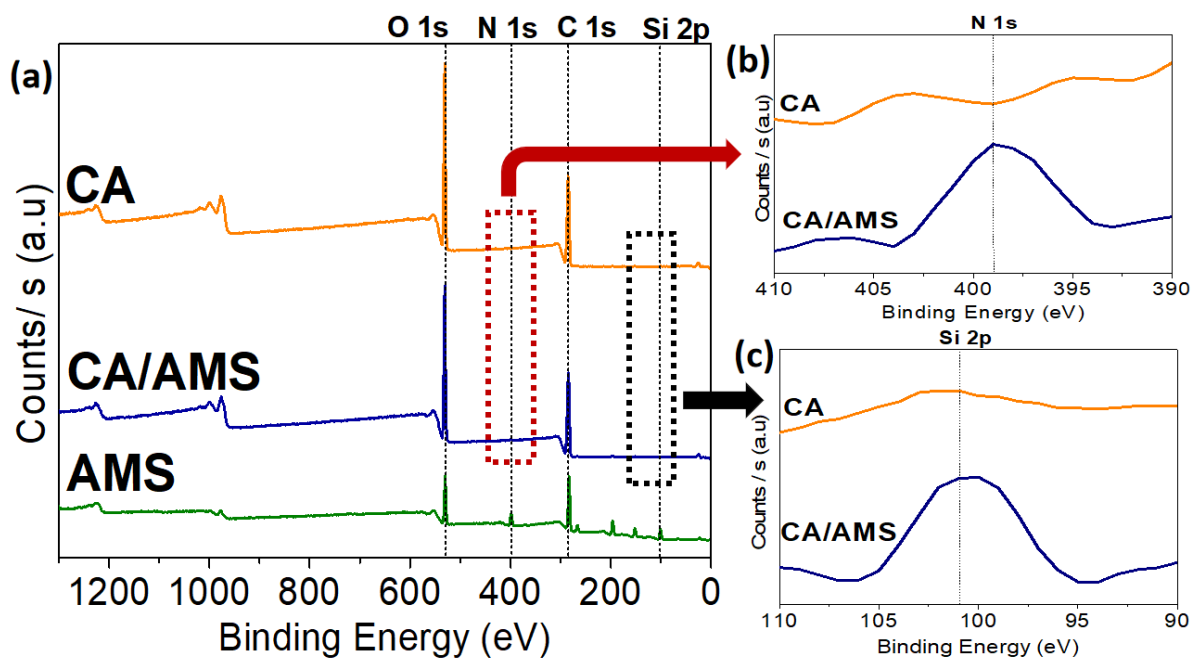
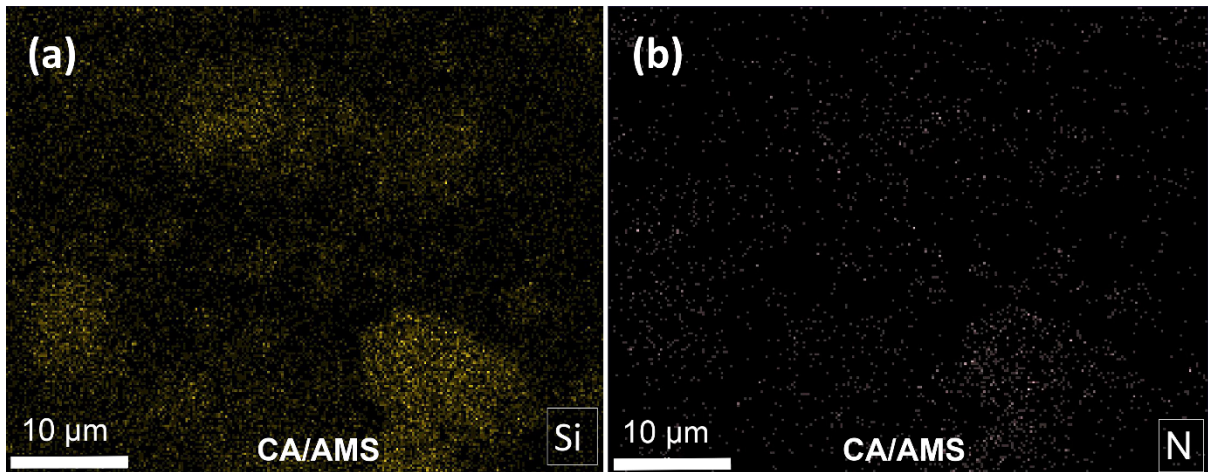
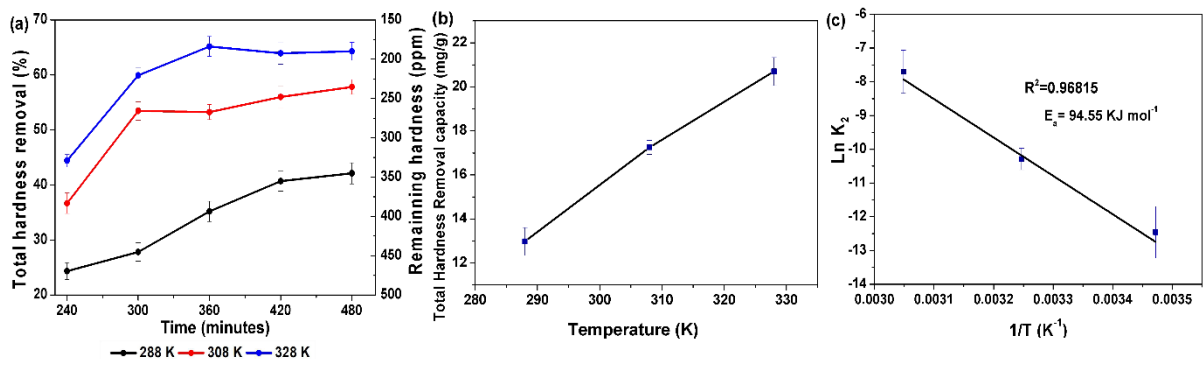


Figure S3: (a) XPS survey spectrum for AMS, CA/AMS, and CA, enlarged peak areas for (b) N1s and (c) Si 2p



**Figure S4:** EDS mapping of (a) Si and (b) N over CA/AMS membrane.



**Figure S5:** (a) Total hardness removal % with time and temperature (b) Total hardness removal capacity at different temperatures and (c) Arrhenius plot for total hardness removal