Abstract Submitted
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Atom Resolved Electron Microscpe Images of Polyvinylidene Fluoride Nanofibers for Water Desalination[1] SUQI LIU, DARRELL RENEKER, The University of Akron — Ultra-thin nanofibers of polyvinylidene fluoride (PVDF), observed with an aberration corrected transmission electron microscope, in a through focus series of 50 images, revealed three-dimensional positions and motions of some molecular segments. The x,y positions of fluorine atoms in the PVDF segments were observed at high resolution as described in (DOI: 10.1039/c5nr01619c). The methods described in (DOI:10.1038/nature11074) were used to measure the positions of fluorine atoms along the observation direction of the microscope. PVDF is widely used to separate salt ions from water in reverse osmosis systems. The observed separation depends on the atomic scale positions and motions of segments of the PVDF molecules. Conformational changes and the associated changes in the directions of the dipole moments of PVDF segments distinguish the diffusion of dipolar water molecules from diffusion of salt ions to accomplish desalination.

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