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Temperature-triggered transformations in shape of layer-by-layer microtubes in aqueous media CHOONGHYUN SUNG, Texas A&M University, College Station, TX 77840, US, AJAY VIDYASAGAR, University of Minnesota, Minneapolis, MN 55455, US, KATELIN HEARN, JODIE LUTKENHAUS, Texas A&M University, College Station, TX 77840, US — Nano- and microstructured layer-by-layer (LbL) assemblies have been of considerable interest for various applications. In particular, one-dimensional LbL microtubes have garnered interest for their ability to shrink or swell in response to changes in pH. Temperature has also been known to trigger transformations in shape. In this presentation, we report on the thermal behavior of LbL microtubes of poly(allylamine hydrochloride) (PAH) and poly(acrylic acid) (PAA). PAH/PAA LbL microtubes were prepared using polycarbonate membranes as porous templates. The thermal behavior of both freely released microtubes and template-bound microtubes was investigated in aqueous media as a function of temperature and time using confocal laser scanning microscopy and scanning electron microscopy. When free microtube suspensions were incubated at high temperatures, the microtubes became shorter and ellipsoid in shape. In contrast, the template-bound microtubes showed periodic voids on the surface. In both cases, pronounced transformations occurred above the hydrated glass transition temperature of the PAH/PAA LbL microtube.

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