Thermoresponsive Chemical Connectors Based on Hybrid Nanowire Forests**

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Swelling/de-swelling of the thermoresponsive NW forests

The swelling/de-swelling behavior of the thermoresponsive NW forests was studied by using a S-4300SE/N field emission variable pressure SEM (Hitachi). After immersing the NW samples in a water bath at ~25°C for 20 min, the samples were taken out and immediately placed in the SEM chamber (100 Pa pressure in the chamber). The SEM images taken immediately after loading inside of the microscope correspond to that of the “wet” state while those taken 30 min after the vacuum pumping (1×10⁻³ Pa pressure in the chamber) correspond to the dry state. It should be noted that the environmental SEM studies present only a rough approximation (lower bound limit) of the actual swelling/de-swelling of the NWs fasteners as the samples were not immersed in water during the imaging due to instrumentation limitation, in contrast to the performed adhesion experiments.

From environmental SEM studies (Fig. S1), we observed 6-10 % change in the overall diameter of NWs (750-850 nm) when transitioning between the wet to dry states. Since the PNIPAM shell is ~100 nm thick, this corresponds to a thickness reduction of 25-40% for the PNIPAM outer shell, consistent with what is often reported in the literature for bulk samples prepared using nearly identical conditions.¹
**Figure S1.** Top-view SEM images of PNIPAM/NW forests at (a) wet and (b) dry states.
Figure S2. Shear wet adhesion strengths of the Ge/parylene/PNIPAM core/multishell NW forests on planar PNIPAM film (red curve) and planar glass substrate (black curve) at different water temperatures.
References