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A Facile Route to Self-assembled Hg//MoSI Nanowire Networks

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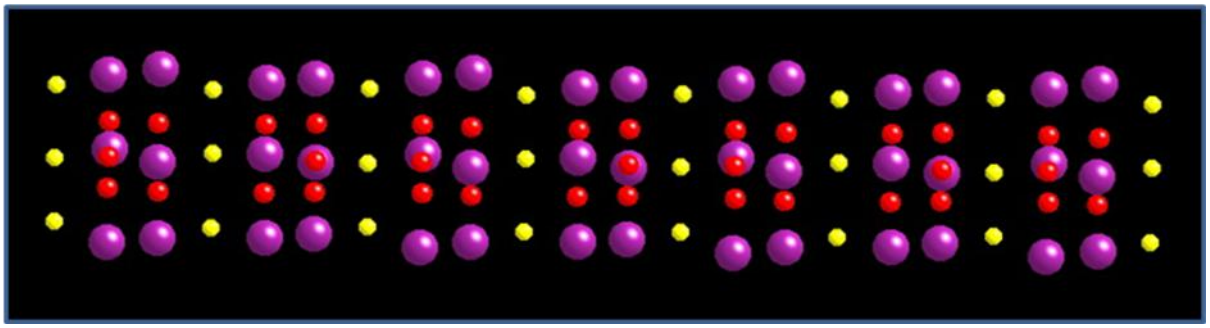

Figure SI1. The structure of a Mo6S3I6 nanowire as determined by Nicolosi et al.[13]. Red, purple and yellow spheres represent Mo, I and S atoms respectively.

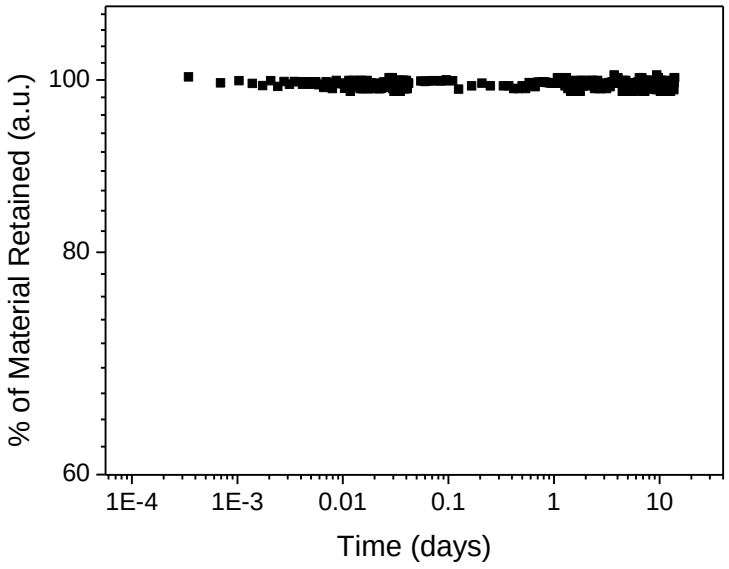

Figure SI2. Sedimentation curve for a MoSI//Hg complex dispersion showing stability against sedimentation over the course of 10 days.

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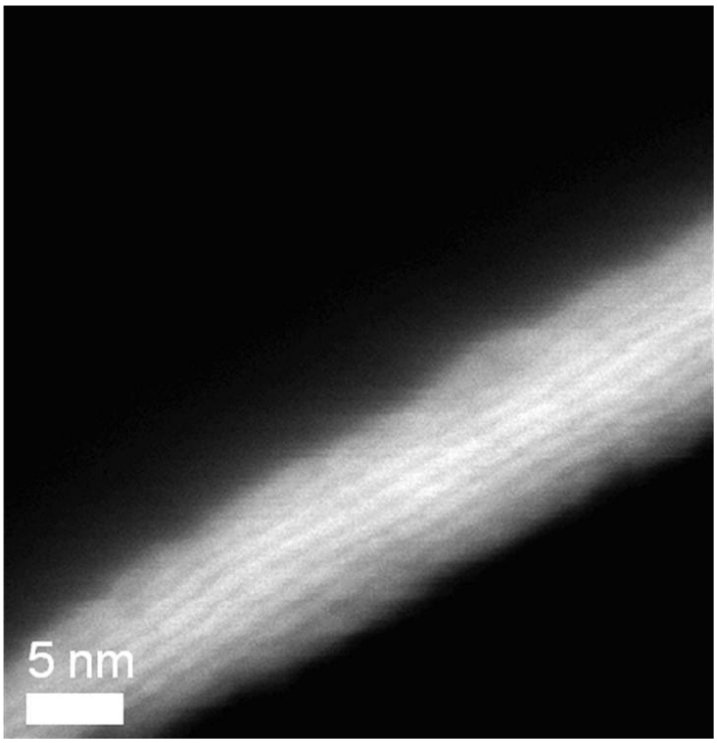

Figure SI3. HAADF STEM image of an Hg//MoSI sample cooled-down at cryo-temperatures and allowed to warm up to room temperature again, showing reappearance of a uniform layer of liquid mercury around the nanowires.

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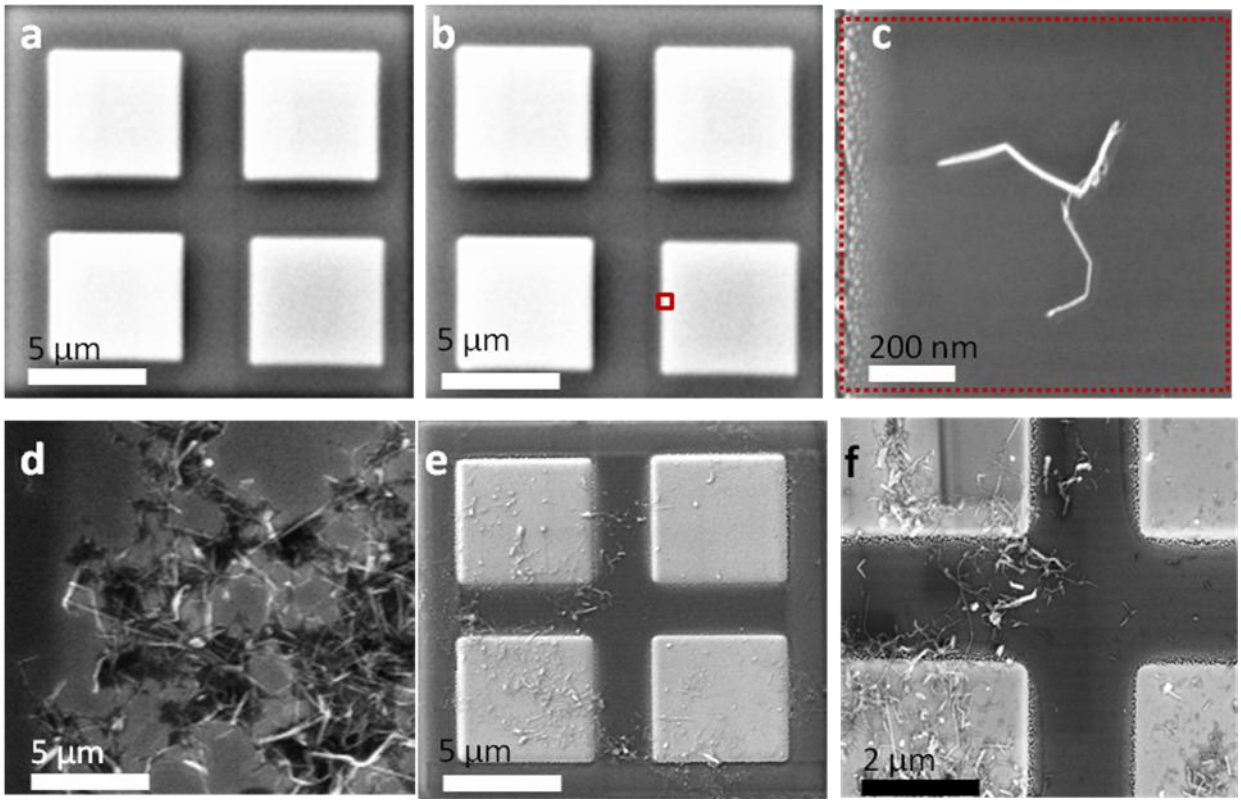

Figure SI4. a) SEM image of the tungsten pads deposited on SiO_2/Si substrate by focused ion beam **(**Zeiss NVision FIB); b) SEM image of the substrate after a solution of unfunctionalised $Mo_6S_3I_6$ nanowires was drop casted on the pads. The unfunctionalised nanowires showed no affinity for the substrate. c) SEM image acquired from the area in red in figure b. This shows the only two nanowire bundles found on the substrate. The rest of the material was found to be re-aggregated at the borders of the silicon substrate (d). A completely different behaviour was instead observed when a drop f Hg//MoSI complex was casted onto the pre-patterned surface (e,f). e) shows a SEM image of the as deposited substrate demonstrating how the Hg//MoSI nanowire networks deposit and interface merely on the tungsten covered areas, leaving the surface between the tungsten pads relatively clean and wire-free. Only very few short aspect ratio nanowire bundles (<2µm in length) can be seen on the silicon dioxide substrate, with the longer ones forming networks bridging and interconnecting two tungsten pads (f).