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Nano-Storage Wires for the Controlled Release of Biochemical Materials HANEUL YOO, DONGJUN LEE, EUNJI KIM, DAESAN KIM, JUHUN PARK, SEUNGHUN HONG, Seoul Natl Univ — We herein report "nano-storage wires" (NSWs) that can store chemical species and release them at a desired moment by electrical stimulations. Here, we utilized the electrodeposition process through an anodized aluminium oxide template to fabricate multi-segmented nanowires which consisted of a polypyrrole (PPy) segment containing adenosine triphosphate (ATP) molecules, a ferromagnetic nickel segment, and a conductive gold segment. We could drive and deposit the NSWs onto desired positions on electrode surfaces via external magnetic fields. When the external electric potential was applied from the electrodes, the NSWs released ATPs from the PPy segments, and the released ATPs could change the activities of motor proteins near the NSWs. Furthermore, through direct writing or magnetic manipulation strategies, we could print NSWs onto various substrates such as flexible or three-dimensional structured substrates to build versatile chemical storage devices. Since our strategy enables the controllable storage and release of chemicals, our development should open up various applications such as drug delivery systems, biosensors and biochips for the controlled release of chemicals to biosystems.

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