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Supporting Information

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Multicomponent Magnetic Nanorods for Biomolecular Separations

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Synthesis of multicomponent magnetic nanorods

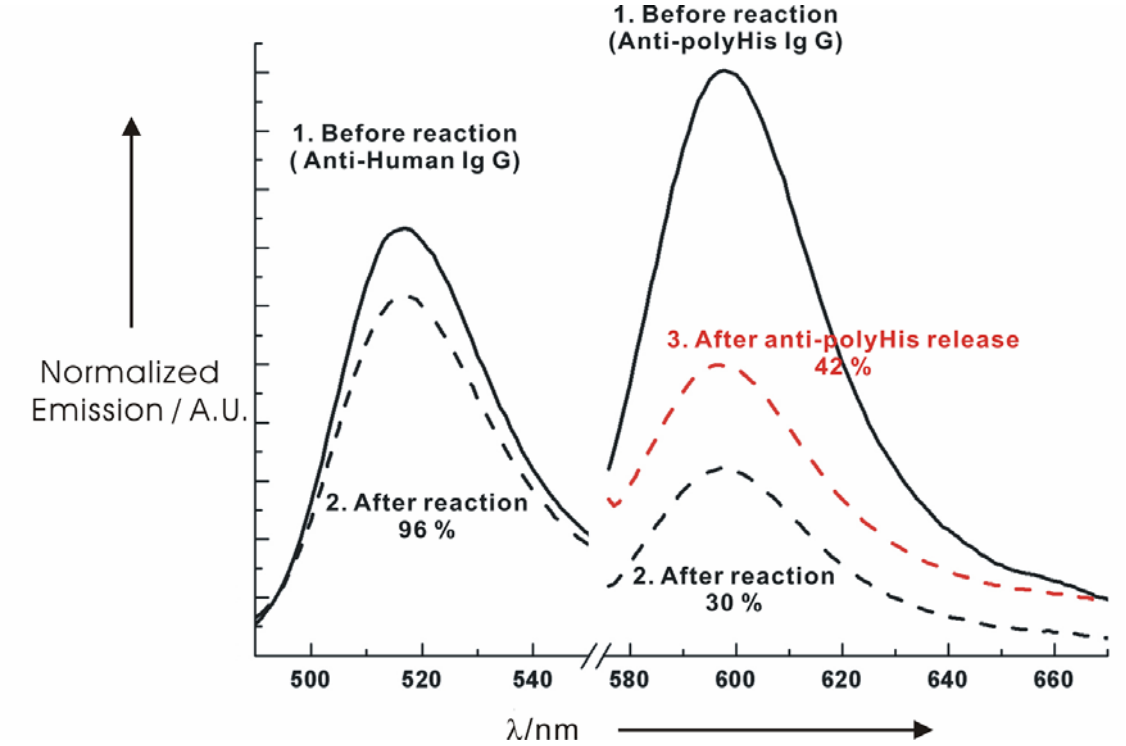
In a typical experiment, a thin layer of silver (200 nm) was evaporated on one side of an alumina filter (Whatman International Ltd, *d* = 13 mm, pore size = 20 nm; the pore diameter in the central region of the filter is substantially larger than the quoted 20 nm.) and served as a cathode in a three electrode electrochemical cell after making physical contact with aluminum foil. Platinum wire was used as a counter electrode, and Ag/AgCl was used as the reference electrode. The nano-pores were filled with Ag (Technic ACR silver RTU solution from Technic, Inc.) at a constant potential, −0.9 V vs Ag/AgCl, by passing 1.5 C/cm^2 for 30 min. An Au block was then electroplated from Orotemp 24 RTU solution (Technic, Inc.) at −0.9 V vs Ag/AgCl followed by a Ni block from nickel sulfamate RTU solution (Tecnnic Inc.) at −0.9 V vs Ag/AgCl. The procedure involving gold was repeated to form the third and final capping block. Each segment length was controlled by monitoring the charge passed through the membrane. The first 1.4 μm (±0.2) long block of gold was generated by passing 1.3 coulombs. The 7.9 μm (±0.4) block of Ni required 15.4 coulombs, and the final 2.6 μm (±0.2) gold block involved the passing of 2.3 coulombs (the exposed membrane surface area is ~1 cm^2). The Ag backing

and alumina membrane were dissolved with concentrated nitric acid and 3 M sodium hydroxide solutions, respectively.

Supporting Information Figure Captions

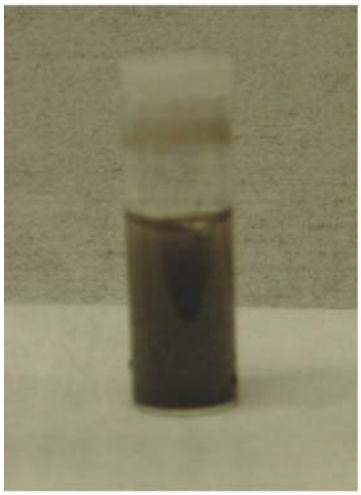
Supporting Figure 1. Fluorescence spectra before and after separation of a mixture of Alexa-488-labeled anti-human IgG and Alexa-568-labeled anti-polyHis IgG with poly-His modified Au-Ni-Au rods. Black solid lines represent a fluorescence spectrum of a mixture of Alexa-488-labeled anti-human IgG and Alexa-568-labeled anti-polyHis IgG. Dashed black traces show a spectrum of supernatant after separation of Alexa-568-labeled anti-polyHis IgG with poly-His modified Au-Ni-Au rods. Dashed red traces show a spectrum of supernatant after separation of Alexa-568-labeled anti-polyHis IgG from rods by changing pH from 7.4 to 2.8 with an eluent buffer solution.

Supporting Figure 2. Pictures showing a suspension of Au-Ni-Au rods in PBS puffer solution (pH = 7.4). Au-Ni-Au rods (a) after rigorous shaking, (b) adsorbed to the sidewalls of a vial due to an external magnetic field.

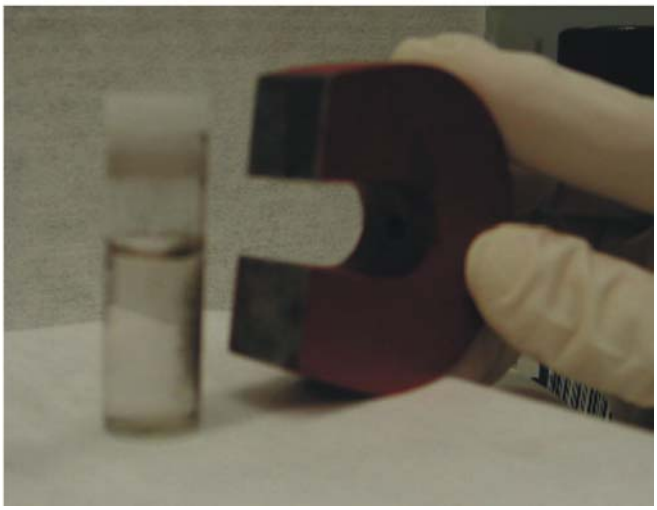


Supporting Figure 1.

A



B



Supporting Figure 2.