Supporting Information

Controlled Release of Hydrogen Isotopes from Hydride-Magnetic Nanomaterials

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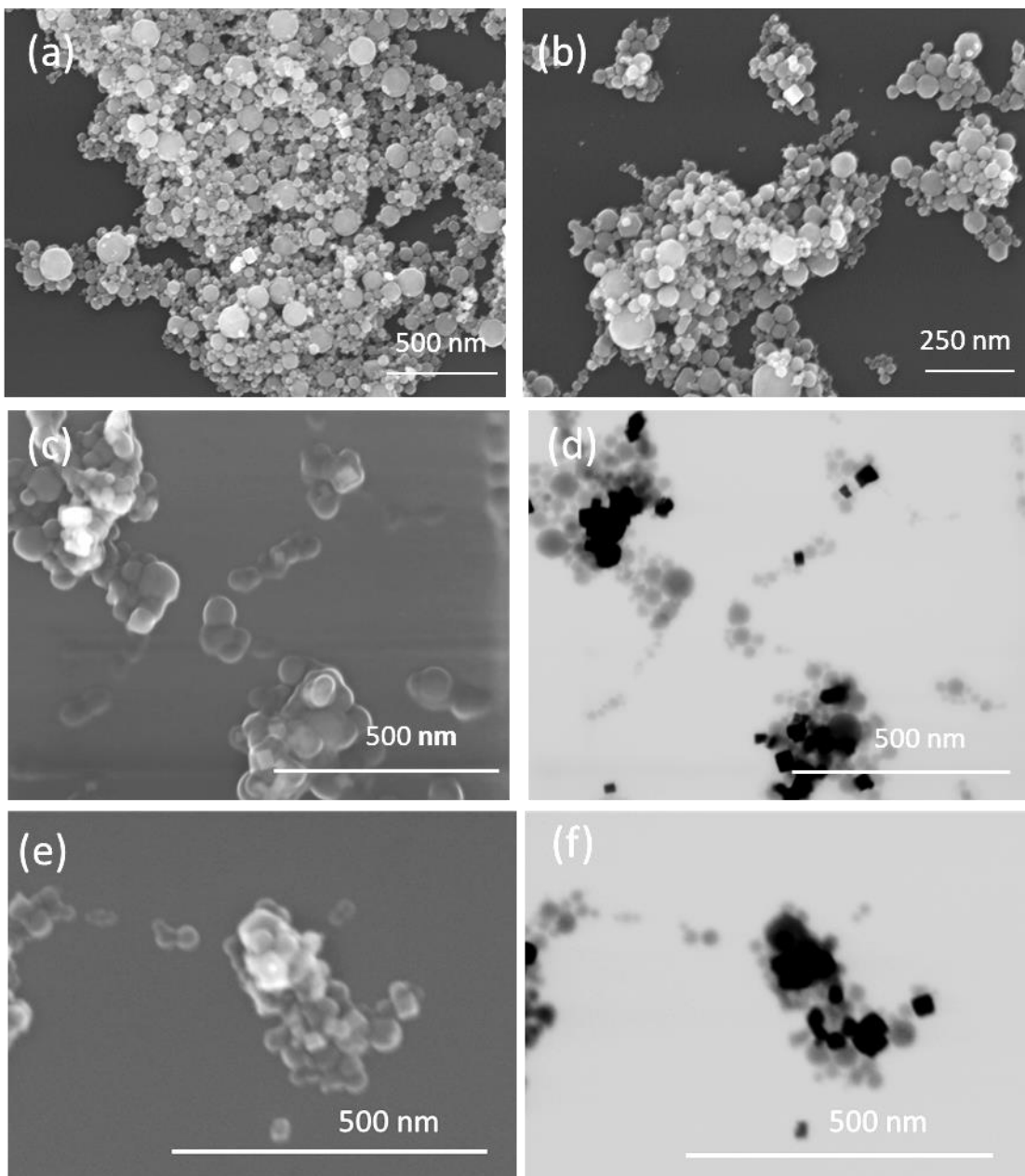**Figure S1.** *(a, b, c, e) SEM images of Fe₂O₃-Pd nanostructures, (d, e) SEM images collected using backscattered electron imaging of Fe₂O₃-Pd nanostructures.*
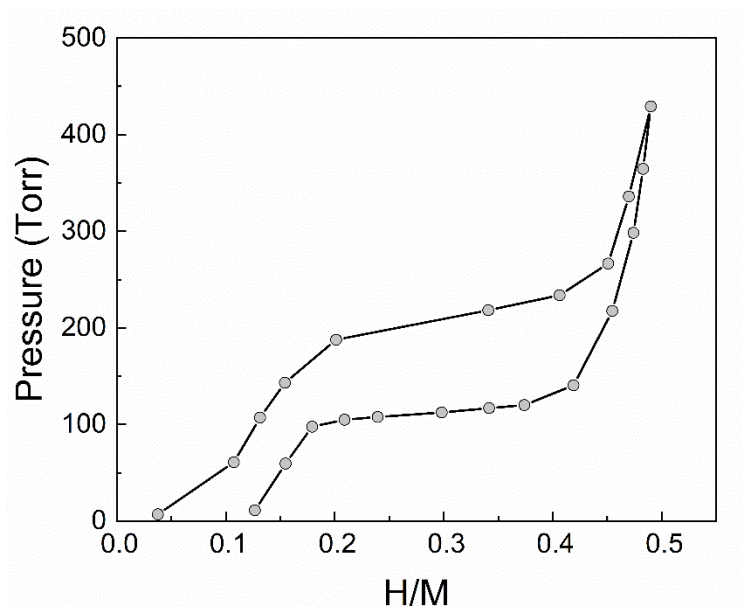
Isotherm on Palladium Nanoparticles

Figure S2. *Protium absorption and desorption isotherm collected at 90 °C on palladium nanoparticles of < 25 nm in diameter (purchased from sigma-aldrich). Compared to the Fe2O3-Pd, the Pd nanoparticles shows comparable capacity of H/M=0.46.*
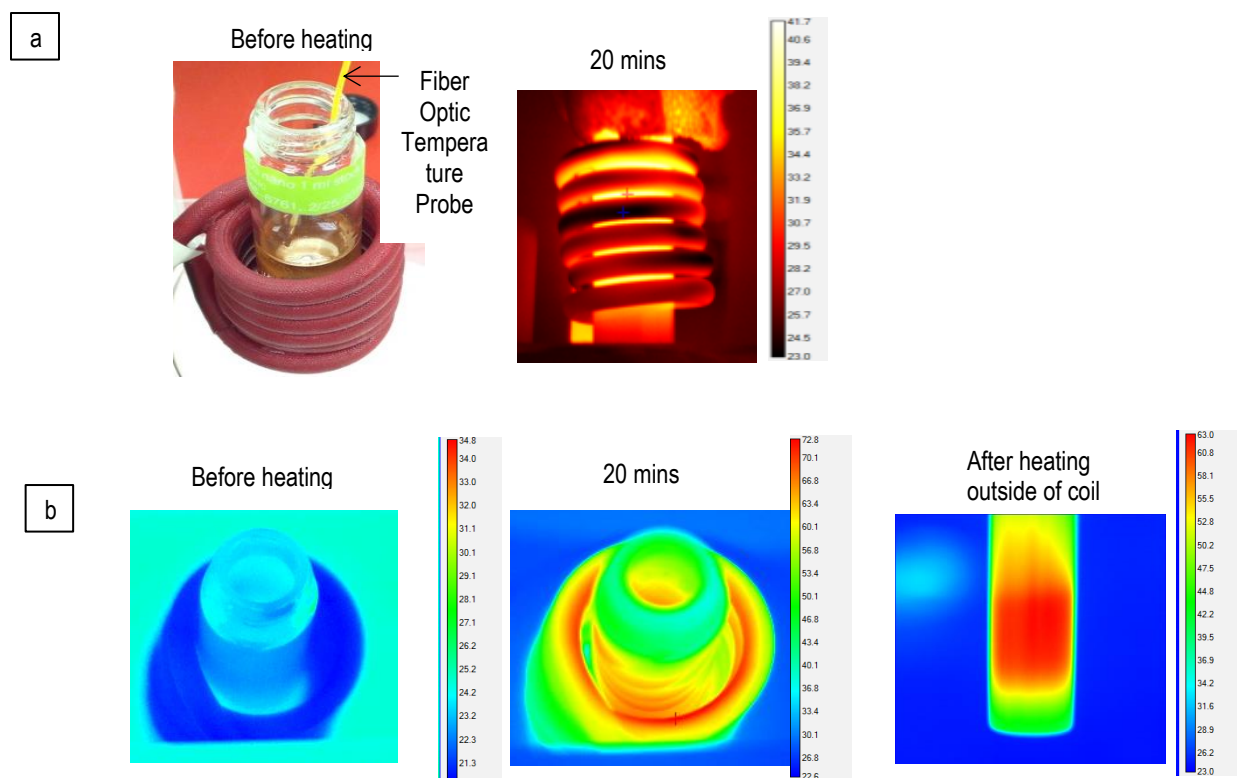
Figure S3. *Photographs and IR heating rate and thermal energy balance profiles of aqueous solutions of Fe2O3 NPs **(a)** side view, before -left- and after 20 minutes heating -right- with the magnetic induced heating device; and **(b)** top view, before and after 20 minutes heating with the alternating magnetic induced heating device (left and center); sample vials after 20 minutes heating outside the coil (right).*

Calculation of Hydrogen concentration

The concentration of they hydrogen concentration in the overhead pressure in the capillaries was calculated based on eq. 1:

$$n = \frac{PV}{RT} \qquad (1)$$

Where n is the number of moles, P is the overhead pressure, R is the gas constant, and T is temperature of the capillaries.