Chemistry for Nano, and Nano for Medicine & Energy

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For the last 20 years, I have been focused on the synthesis and medical & energy applications of uniform-sized nanocrystals and related nanomaterials. We reported that uniform 2 nm iron oxide nanoclusters are used as T1 MRI contrast agent for high-resolution MR angiography of monkeys. We demonstrated that ceria-based nanoparticles can work as therapeutic antioxidants to treat various nasty diseases, and as radioprotectants. We report a highly sensitive and selective K^+ nanosensor that can quantitatively monitor extracellular K^+ concentration in the brains of freely moving mice experiencing epileptic seizures. We present a synthesis of highly durable and active electrocatalysts based on nanoparticles of fct-PtFe and FeP. We reported highly active and stable Co-N_4(O) single atom catalyst for electrochemical H_2O_2 production. We reported highly active single atom Cu_1/TiO_2 photocatalysts for hydrogen generation.