3D magnetic nanostructures for the fabrication of sensors/actuators and energy harvesting device

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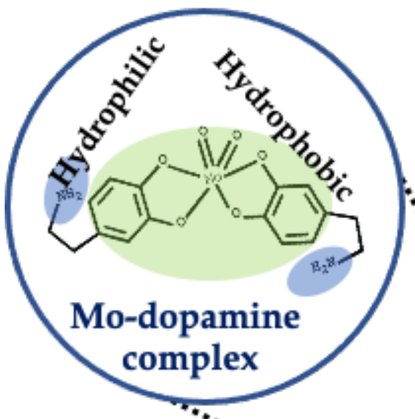
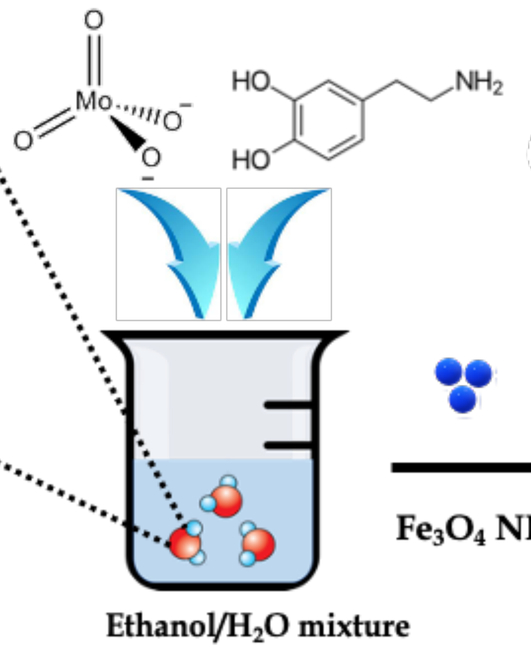
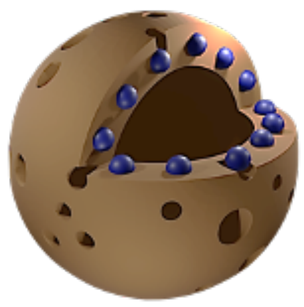
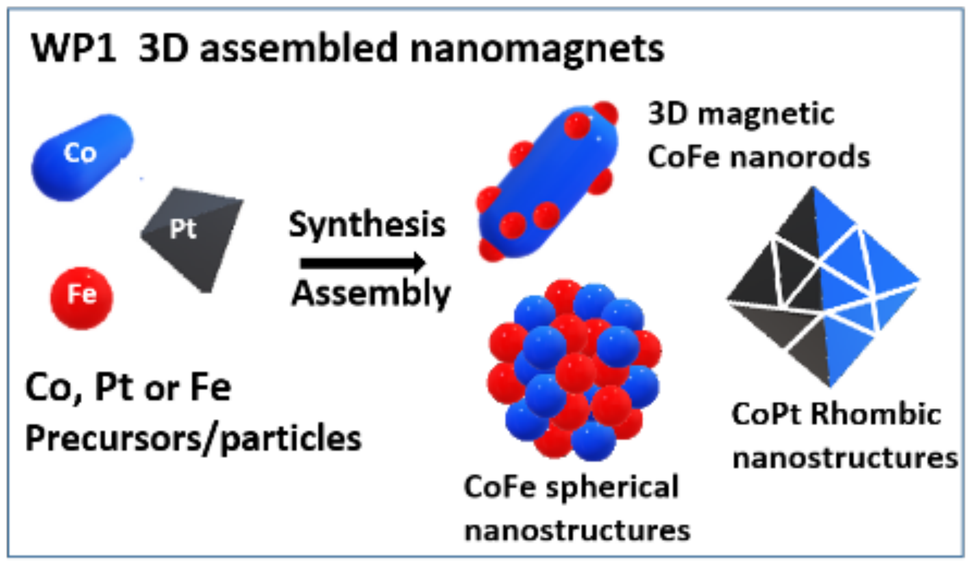
3D nanomagnets: Syntheses and characterization[#]





3D magnetic MoO_3-PDA nanospheres





Background

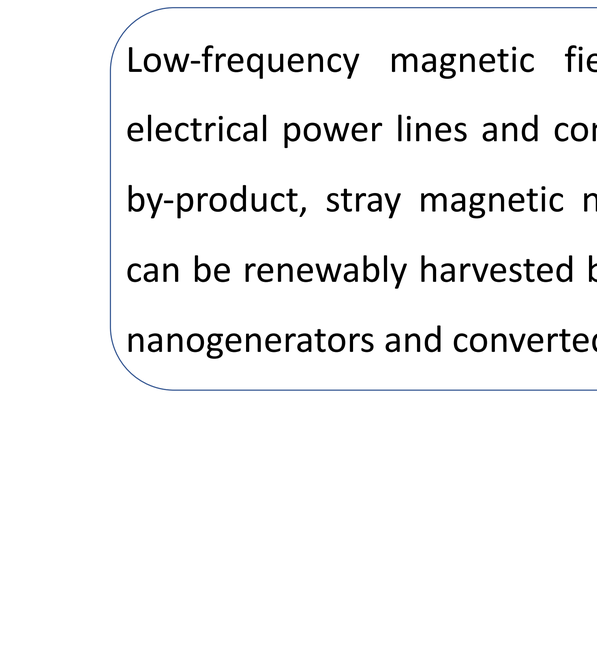
Low-frequency magnetic fields are generated by electrical power lines and consumer electronics. As a by-product, stray magnetic noise are emitted which can be renewably harvested by using electromagnetic nanogenerators and converted to useful electricity.

3D Magnetic Nanostructures

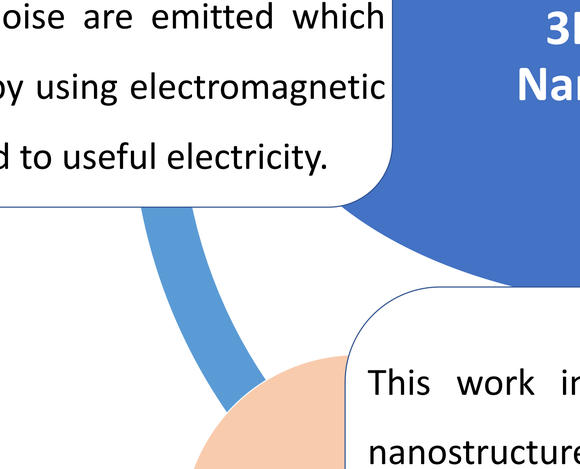
3D geometry has a direct impact on the magnetic configurations and magnetization of magnetic nanoparticles due to spatial coordinates[#]. Novel nanoassemblies of 3D nanomagnets ranging from nanosphere-, nanorod-, hexagonal-shaped nanostructures are synthesized for application in magnetic nanogenerator device for harvesting ambient stray magnetic noise.

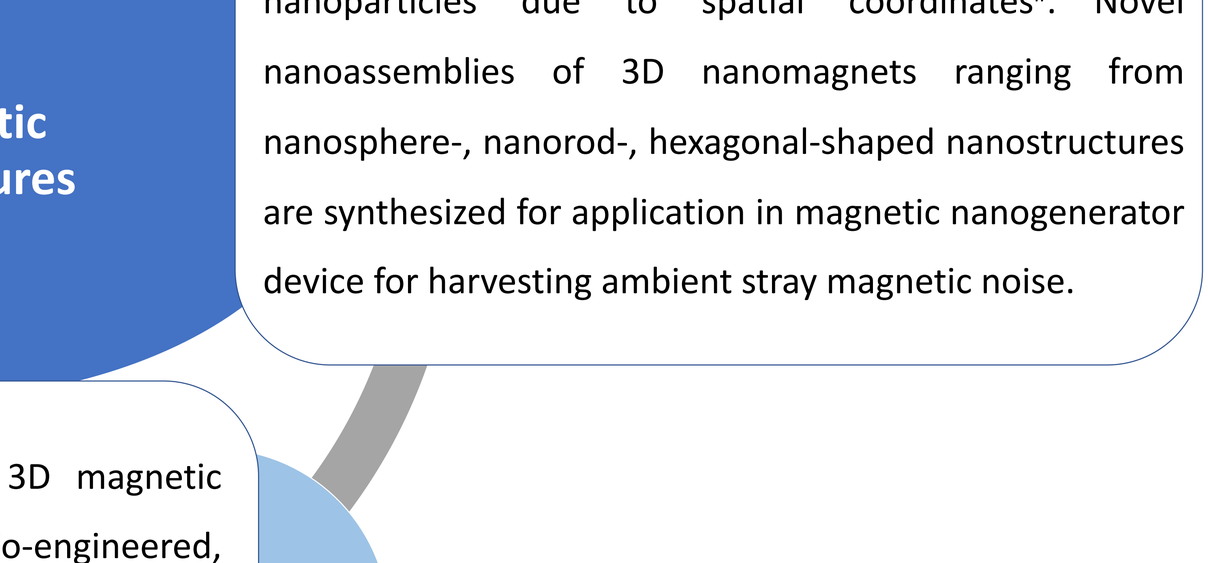
This work implements 3D magnetic nanostructures and bio-engineered, eco-friendly polymers to fabricate nanogenerators which can induce efficient magneto-mechano-electric coupling effects for magnetic actuation and energy harvesting.

Actuators and energy harvesting



Magneto-mechano-electric (Energy Harvesting Device)





Design of magneto-mechano-electric energy harvesting device via magnetic actuation/ piezoelectric effects

(*Sustain. Energ. Fuels, 2017, 1, 2039*) [#]*Nat. Comm, 2017, 8, 15756.* [#]*Nanoscale Adv*. **4**, 871, 2022

Acknowledgements

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 945380.

IAS, University of Warwick