

Nanoparticles Laboratory @ the Hashemite University

Department of Physics

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Nanoparticles are small objects that are typically less than 100 nm in size. They are widely used in a wide range of technological fields, including permanent magnets, chemical sensors, magnetic energy storage, electronic devices, and biomedical applications. We can make a variety of nanoparticles in our lab, primarily magnetic nanoparticles. These nanoparticles can be synthesized using a variety of methods, including the hydrothermal method, the solid state reaction method, and the ball-milling method. The lab was built from scratch with generous support from the Hashemite University, at a typical cost of around 120,000 JD. The lab hosts the following equipments.

#	Equipment name	Model
1	Resist spinner	Apogee
2	Digital Weighing balance	AS110.R2- RADWAG
3	Digital Hotplate and sterrier	AREX VELP
4	Ultrasonic cleaner	Type DT52 - Bandelin
5	Digital multimeter	Keysight U1272A DMM Handheld
6	source measure unit	Keysight B2902APrecision Source/Measure Unit
7	Tube furnace equipped with gas mixing and pumping system	High-Temperature Tube Furnace Model RHTC 80-230/15 Nabertherm
8	Planetary Micro Mill	PULVERISETTE 7 premium line
9	Advanced Metallurgical Microscope	B-1000MET-Optika
10	Manual Hydraulic Press - 15 Ton	15 Tons Manual Press Model 54- MP150-Maassen,
11	Vacuum oven	AccuTemp-09s -Cross international

The samples of the following recently published articles were totally synthesized in my lab:

- **Gassem M. Alzoubi**, B. A. Albiss, M. Shatnawi, I. Bsoul, A. M. Alsmadi¹, B. Salameh, G. . Alna'washi¹, Influence of High-Temperature Annealing on Structural and Magnetic Properties of Crystalline Cobalt Ferrite Nanoparticles in the Single-Domain Regime, *Journal of Superconductivity and Novel Magnetism*. 33, 3179–3188 (2020)
- **Gassem M. Alzoubi**, A. M. Alsmadi¹ , G. A. Alna'washi¹, B. Salameh , M. Shatnawi¹, Sufian Alnemrat¹, B. A. Albiss, I. Bsoul, *Coexistence of superparamagnetism and spin-glass like behavior in zinc-substituted cobalt ferrite nanoparticles*, *Applied Physics A*. 126, NO 512, 1-11 (2020)
- **Gassem M. Alzoubi**, *Probing the structural and magnetic properties of small crystalline nickel ferrite nanoparticles near the upper size limit of the single-domain regime*, *ADVANCES IN APPLIED CERAMICS*. 2020, VOL. 119, NO. 4, 224–232