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Magnetic Properties of Barium Ferrite Thin Films on Pt(111) by a Sol–Gel Method

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Crystallographic and magnetic properties of barium hexaferrite thin films prepared by a sol–gel method were investigated. The resulting precursor solutions were made at 0.2 M. Films were spin-coated onto Pt(111)/Ti/SiO₂/Si(100) substrates, dried and then heated in air at various temperatures. High coercivities were obtained in these nanocrystalline thin films, 4–5 kOe for hexaferrite. The crystal structures were measured by an X-ray diffractometer (XRD) and magnetic properties were measured using a vibrating sample magnetometer (VSM) at a maximum applied field of 10 kOe. An atomic force microscope (AFM) was used to detect the grain size and surface morphology. Thermal analysis such as thermogravimetry analysis (TGA) and differential thermal analysis (DTA) was performed on the dried powder obtained from the Ba ferrite precursor solution.