

Title of Document: FABRICATION OF SOFT, FERROMAGNETIC FILMS AND DEVICES
AND THEIR PROPERTIES, PRINTABILITY, AND APPLICATIONS

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Abstract

Materials enabling fabrication of multifunctional devices are a cornerstone of present-day materials science and engineering. Multifunctionality enables use for novel applications in fields like energy, health, sensing, etc. We conducted an extensive literature review into the development of one material capable of multifunctional device fabrication, elastic magnetic films and devices, which have two notable properties: magnetizability, and physical softness and compliance. We highlighted materials, fabrication, characterization, and resulting interactions harnessed to develop inks used to fabricate these films, as well as broadscale applications. We also experimented with an Fe_3O_4 -PDMS compliant magnetic film to characterize magnetic properties under modes of deformation. Through bending and twisting, the magnetic saturation, coercivity, and retentivity were measured. Results revealed that bent configurations preserved magnetic characteristics better than twisting configurations; out of tested twisting angles, a 180° rotation displayed properties closest to the undeformed state. We concluded by describing the potential of future research endeavors.