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Spray deposited anisotropic magnetic hybrid thin films containing PS-b-PMMA and strontium hexaferrite magnetic nanoplates

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Spray deposition is employed to fabricate anisotropic ferromagnetic thin films composed of the ultrahigh molecular weight diblock copolymer (DBC) polystyrene-*block*-poly(methyl methacrylate) and strontium hexaferrite nanoplates functionalized with hydrophilic groups. During spray deposition, the kinetics of structure evolution of the hybrid films is monitored in situ with grazing incidence small angle X-ray scattering. A pure polymer film is also deposited as a reference with same conditions. The obtained final hybrid film is then solvent annealed to increase the domain size of the DBC for the incorporation of more nanoplates. Due to the rearrangement of the nanoplates inside the DBC during solvent annealing, an obvious change in the magnetic behavior of the hybrid film is observed via superconducting quantum interference device investigation. After solvent annealing, the hybrid film shows extremely weak magnetic anisotropy. While it exhibits magnetic anisotropy before solvent annealing.

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