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Fluorination of epitaxial oxides: Creating ferrite and nickelate oxyfluoride films[1] STEVEN MAY, EUN JU MOON, Drexel University, YUJUN XIE, Argonne National Laboratory, DAVID KEAVNEY, JUSTIN GOEBEL, ERIC LAIRD, CHRISTOPHER LI, Drexel University — In ABO_3 perovskites, the physical properties are directly coupled to the nominal valence state of the B-site cation. In epitaxial thin films, the dominant strategy to control B-site valence is through the selection of a di- or trivalent cation on the A-site. However, this approach is limited, particularly when electron doping on the B-site is desired. Here we report a simple method for realizing oxyfluoride films, where the substitution of F for O is expected to reduce the B-site valence, providing a new means to tune electronic, optical and magnetic properties in thin films. Fluorination is achieved by spin coating an oxygen deficient film with poly(vinylidene fluoride). The film/polymer bilayer is then annealed, promoting the diffusion of F into the film. We have used this method to synthesize $SrFeO_{3-\delta}F_\delta$ and $LaNiO_{3-\delta}F_\delta$ (δ ? 0.5) films, as confirmed by x-ray photoemission spectroscopy and x-ray absorption spectroscopy.

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Steven May
Drexel University

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