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Search for alternative or reduced rare-earth content ferromagnetic materials for permanent magnet applications.[1] TEJ LAMICHHANE, Iowa State Univ, VALENTIN TAUFOUR, Ames Laboratory, MORGAN MASTERS, UDHARA KALUARACHCHI, Iowa State Univ, SRINIVASA THIMMAIAH, ANDRIY PALASYUK, Ames Laboratory, DAVID PARKER, Oak Ridge National Laboratory, SERGEY BUD'KO, PAUL CANFIELD, Iowa State Univ — Current commercial magnets (e.g. $Nd_2Fe_{14}B$ and $SmCo_5$) are based on critical rare-earth elements like Nd, Dy and Sm and the supply security of these materials is uncertain. Finding new ferromagnetic compounds without critical elements or reducing the content of critical rare-earth elements in existing rare-earth magnets without compromising in magnetic properties are the two possible routes to overcome the problem of criticality. In the first approach, we have synthesized the single crystals of the transition metal rich ternary ferromagnetic compounds: $Mn_{1.05}Rh_{0.02}Bi$, solid solution of $(Fe_{1-x}Co_x)_2B$, Fe_5B_2P, ZrMnP and HfMnP via flux growth technique and studied their magnetic anisotropic properties. In the second option we are exploring the possible routes for reducing the rare-earth content in commercial magnetic materials or finding non-critical rare-earth elements based ferromagnetic materials. In this talk we will review the progress we have made using each of these approaches.

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