

SOLID STATE CHEMISTRY APPROACHES TO ITINERANT MAGNETS Kirill Kovnir, Corey M. Thompson, Alexandra A. Arico, Michael Shatruk, *Department of Chemistry & Biochemistry, Florida State University, 95 Chieftan Way, Tallahassee, FL 32306, United States, E-mail: shatruk@chem.fsu.edu*

The search for novel magnetic materials with improved performance requires fundamental understanding of correlations between the crystal and magnetic structures of existing materials, as well as innovative synthetic approaches that target the discovery of new magnets. Our study of RCo_2P_2 phases (R = rare earth) serves as an example of such approach. A judicious modification of the chemical composition gives rise to multiple magnetic transitions with controllable ordering temperatures in $\text{La}_{1-x}\text{Pr}_x\text{Co}_2\text{P}_2$. Chemical pressure emerging from the difference in ionic sizes triggers fast electron fluctuation and the change in type of magnetic ordering in $\text{Pr}_{1-x}\text{Eu}_x\text{Co}_2\text{P}_2$. Finally, incorporation of Bi into the structure of LaCo_2As_2 , as the result of a new synthetic approach, leads to a dramatic modification of magnetic properties that can be traced to fine changes in the crystal structure of the material.