

Abstract

I will report my group research progress in the past one year, mainly focusing on the new superconductors we discovered in 2018. Two approaches to new superconductors are 1. Critical charge-transfer pairs for the superconductivity; 2. Anomalous oxidation states by suppressing the charge disproportionation. We have discovered a series of new superconductors containing Pt-Bi charge-transfer pair, and the superconductivity in tetragonal layered compound, SrSnP, in which Sn ion is single valent rather than mixed valent of 0 and 2+.

I will talk about our study on Zintl phases with exotic magnetic and topological properties such as topological Nodal-line semimetals. My group also works on the high pressure single-crystal X-ray diffraction study on these materials to see how the structure changes under high pressure.

In the end, I will present our recent work on new layered magnetic semiconductors/semimetals, including some unpublished work. The exploratory strategy is exchanging ions to tune the magnetic properties. Potential topological properties are taken into consideration in these materials.

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