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**Novel QuantumMaterials under High Pressure**

**Abstract:** Design and discovery of new quantum materials will accelerate the development of new technologies in the future. I will report my group research progress in the past two years, mainly focusing on exploring new superconductors and magnetic quantum materials under high pressure. I will introduce how we use the lab-based in-situ single crystal X-ray diffraction to detect the phase transition under high pressure and how we synthesize the single crystals of new iridates family under high pressure and high temperature. I will also talk about how we find the new nickel-based compounds with Kagome lattice and charge density waves (CDWs) inspired from chemistry phase diagram and suppress the CDWs to induce superconductivity.

**Reference**

1. **Xie, W.\*** The search for superconductivity just got wider. *Nature*, **2024**, 509-510.
2. Xu, M., Huyan, S., Wang, H., Bud'ko, S.L., Chen, X., Ke, X., Mitchell, J.F., Canfield, P.C., Li, J., **Xie, W.**\* Pressure‐Dependent “Insulator-Metal-Insulator” Behavior in Sr-Doped La3Ni2O7. *Adv. Electron. Mater.* **2024**, 2400078.
3. Wang, H., Chen, L., Rutherford, A., Zhou, H., **Xie, W\***. Long-Range Structural Order in a Hidden Phase of Ruddlesden-Popper Bilayer Nickelates La3Ni2O7. *Inorg. Chem.* **2024**, 63, 11, 5020–5026.
4. Ye, J., Lin, Y., Wang, H., Song, Z., Feng, J., **Xie, W.** Jia, S. Layered Kagome Compound Na2Ni3S4 with Topological Flat Band. *Chin. Phys. B.* **2024**.
5. Wang, H., Xu, X., Ni, D., Walker, D., Li, J., Cava, R. J., **Xie, W.**\* Impersonating a Superconductor: High-Pressure BaCoO3, an Insulating Ferromagnet. *J. Am. Chem. Soc.* **2023**, 145, 21203-21206.
6. Wang, H., Shi, L., Huyan, S., Jose, G.C., Lavina, B., Bud’ko, S.L., Bi, W., Canfield, P.C., Cheng, J. **Xie, W.\*** Pressure-induced insulator-to-metal transition in the quantum spin liquid candidate lithium ytterbium diselenide. *Cell Reports Physical Science*, **2024**, 5(6), 101989.
7. Dissanayaka Mudiyanselage, R. S.; Wang, H.; Vilella, O.; Mourigal, M.; Kotliar, G.; **Xie, W**.\* LiYbSe2: Frustrated Magnetism in the Pyrochlore Lattice. *J. Am. Chem. Soc.* **2022**, 144, 11933-11937. (Selected as the Cover)