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【637】Unconventional superconductivity with Tc = 30 K in stoichiometric ThFeAsN

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The actinide superconductor ThFeAsN exhibits a T_c of 30 K without doping or external pressure. Formally similar to LaFeAsO and predicted to be an antiferromagnet, surprisingly, the new material does not show any magnetic order.
Based on results of a series of ambient- and high-pressure experiments and DFT calculations [1,2], we show how ThFeAsN combines the peculiarities of unconventional superconductivity with those of correlated electron systems. We further compare the role of charge doping vs. structural distortions and argue why the "structural route"to superconductivity is so unusual in iron-based compounds.

1. T. Shiroka et al., Nature Comm. 8, 156 (2017).
2. N. Barbero et al., Phys. Rev. B 97, 140506(R) (2018).

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