

Abstract Submitted  
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**A possible new family of unconventional high temperature superconductors** JIANGPING HU, Chinese Academy of Sciences (CAS), CONGCONG LE, Institute of physics, CAS — We suggest a new family of Co/Ni-based materials that may host unconventional high temperature superconductivity (high- $T_c$ ). These materials carry layered square lattices with each layer being formed by vertex-shared transition metal tetrahedra cation-anion complexes. The electronic physics in these materials is determined by the two dimensional layer and is fully attributed to the three near degenerated  $t_{2g}$  d-orbitals close to a  $d^7$  filling configuration in the d-shell of Co/Ni atoms . The electronic structure meets the necessary criteria for unconventional high  $T_c$  materials proposed recently by us to unify the two known high- $T_c$  families, cuprates and iron-based superconductors. We predict that they host superconducting states with a d-wave pairing symmetry with  $T_c$  potentially higher than those of iron-based superconductors. These materials, if realized, can be a fertile new ground to study strongly correlated electronic physics and provide decisive evidence for superconducting pairing mechanism.

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