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Surface States of Perovskite Iridates $AIrO_3$; Signatures of Topological Crystalline Metal with Nontrivial Z_2 Index HEUNG-SIK KIM, YIGE CHEN, HAE-YOUNG KEE, Department of Physics, University of Toronto — There have been increasing efforts in realizing topological metallic phases with nontrivial surface states, including a topological crystalline metal phase with flat surface states suggested recently. Here we perform first-principles electronic structure calculations for epitaxially stabilized orthorhombic perovskite iridates with *Pbnm* symmetry. Remarkably, two types of distinct topological surface states are found depending on the surface direction. On the side surfaces, flat surface states protected by the mirror symmetry emerge manifesting the topological crystalline character. On the top surface where mirror symmetry is broken, a Dirac cone appears indicating a nontrivial topology of the nodal metal. Indeed, there is a well-defined two dimensional topological Z_2 index associated with time reversal symmetry leading to the Dirac surface state. Transitions to weak and strong topological insulators and implications of different surface states in light of angle resolved photoemission spectroscopy are also discussed.

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