

Abstract Submitted
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A ferroelectric-like structural transition in a metallic 5d oxide LiOsO_3 KAZUNARI YAMAURA, YOUGUO SHI, MASAO ARAI, National Institute for Materials Science, Japan, KENJI TSUDA, Tohoku University, Japan, YANFENG GUO, ANDREW PRINCEP, ANDREW BOOTHROYD, University of Oxford, UK, DMITRY KHALYAVIN, PASCAL MANUEL, Rutherford Appleton Laboratory, UK — Metals cannot exhibit ferroelectricity because static internal electric fields are screened by conduction electrons, but in 1965, Anderson and Blount predicted the possibility of a “ferroelectric” metal, in which a ferroelectric-like transition occurs in the metallic state. Up to now, no clear example of such a material has been identified. Here we report on a centrosymmetric ($R\bar{3}c$) to non-centrosymmetric ($R3c$) transition in metallic LiOsO_3 that is structurally equivalent to the ferroelectric transition of LiNbO_3 . The transition involves a continuous shift in the mean position of Li^+ ions on cooling below 140 K. Its discovery realizes the scenario described by Anderson and Blount, and establishes a new class of materials whose properties may differ from those of normal metals. This research was supported in part by a Grant-in-Aid for Scientific Research (22246083, 25289233) from JSPS, Japan; the Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program) from JSPS, Japan; and the United Kingdom Engineering and Physical Sciences Research Council (EPSRC).

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