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Transitions toward complex electronic states and superperiodic structures in MPTBp

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Monophosphate tungsten bronzes (MPTB) with the chemical formula (PO2)4(WO3)2m and m ranging from 2 to 14 can be described by the regular stacking of PO4 tetrahedra slices and WO6 octahedra slabs [1]; the thickness of the tungsten slab is proportional to m. MPTB are quasi 2D metals and show quasi-2D electronic character due to 5d conduction electrons confined with WO6 layers. They exhibit successive phase transitions toward charge density wave (CDW) states at different critical temperatures Tp1, Tp2 [2]… These transitions are associated to lattice distortions leading to the appearance of incommensurate or commensurate structural modulations. This family of compounds, with the electronic dimensionality governed by the m parameter, is thus a relevant system to analyze the influence of the dimensionality on the electronic instabilities such as CDW states. CDW transitions exhibit signature both from structural and physical properties point of view [3]; X-ray diffraction experiments using classical sources but also synchrotron radiations as well as physical properties analysis (transport, magnetism …) can be then used to characterized electronic instabilities. Accurate studies of the phase transitions were performed for MPTB with different m values using X-ray thermo diffraction as well as transport measurements. These complementary investigations evidenced different characteristics for members with low or high m values such as symmetry lowering; incommensurate or commensurate modulations; first order or second order phase transition …

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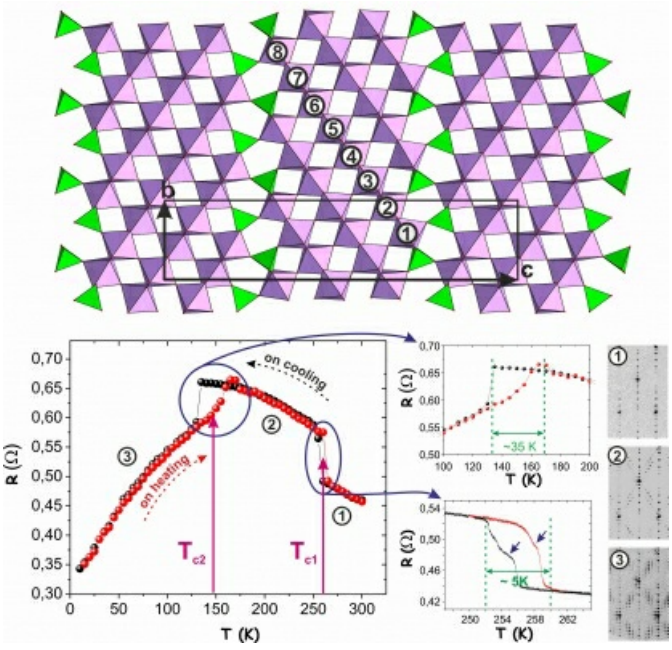

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