

Abstract Submitted
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High Temperature Phase Transitions in RbH₂PO₄ HEBER MARTINEZ, CRISTIAN BOTEZ, RON TACKETT, RUSSELL CHIANELLI, Department of Physics, University of Texas at El Paso — MH₂PO₄ (M=Cs, Rb) solid acids exhibit a several-order-of-magnitude increase in proton conductivity upon heating above a temperature threshold [1, 2]. This behavior allows these solid acids to function as fuel-cell electrolytes at intermediate temperatures [3]; this has attracted much interest. We studied the structure of RDP when heated within the 25-250 °C range. We used temperature- and time-resolved powder XRD on powder RDP. Our XRD data, evidenced a tetragonal to monoclinic transition that occurs within the 90-110 °C interval. Rietveld refinements demonstrate that the newly observed monoclinic structure is a RDP polymorph. This suggests that the superprotonic behavior in RDP might be triggered by a monoclinic-cubic polymorphic transition *similar* to the one observed in CsH₂PO₄. Further heating of the sample, under ambient pressure and humidity conditions, results in dehydration. A possible method to avoid dehydration in future research is to carry out the heating on samples subjected to high pressures of about 1GPa [1,2,4]. [1] Boysen *et al.*, Chem. Mater. **15**, 727(2003). [2] Boysen *et al.*, Chem. Mater. **16**, 693(2004). [3] Boysen et al., Science **303**, 68(2004). [4] Botez et al., J. Chem. Phys. **127**, 194701(2007)

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