Abstract Submitted
for the TSF16 Meeting of
The American Physical Society

Alkali-metal (M) dihydrogen phosphates MH_2PO_4 stability at superprotonic behavior temperatures.[1] ISRAEL MARTINEZ, ANDREA MONTGOMERY, JUAN LEAL, ALAN GOOS, ANDRES ENCERRADO, CRISTIAN BOTEZ, None — Alkali-metal (M) dihydrogen phosphates MH_2PO_4 (solid acids) have a particular behavior, at high temperatures they show a huge proton conductivity increase (1000-fold) (e.g. RbH_2PO_4 and CsH_2PO_4 (CDP)) upon heating above a certain temperature TS. The so called superprotonic behavior observed in CDP at temperatures above TS=237C has been previously reported; and this behavior is particularly attractive to use alkali-metal dihydrogen phosphates as a fuel cell electrolytes in the intermediate temperatures range. A major drawback is that the cubic CDP phase (which have been previously debated to be the main cause to generate the superprotonic behavior in the solid acids) is not stable under ambient humidity and pressure conditions at TS temperatures, becoming a huge barrier to mass production. Indeed, CDP dehydrates and decomposes chemically after its polymorphic transition from the room temperature (RT) monoclinic phase to the HT cubic. In order to treat the CDP and become more stable, dopants (such as SiO_2) in combination of different humidity conditions have been tried to delay the dehydration of the CDP after the superprotonic its been achieved.

[1]We would like to thank DoD (Grant number 64705CHREP)

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None

Date submitted: 23 Sep 2016 Electronic form version 1.4