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A Tantalising, Faster Oxide Ion Conducting Electrolyte (La2Mo2-xTaxO9)

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Humanity needs alternative energy solutions as fossil fuels deplete and climate change threatens our world. Solid Oxide Fuel and electrolyzer cells (SOFCs and SOECs) may not solve the problem but provide diversity to the world's energy sources portfolio, these electrochemical converters improve the efficiency at which we utilise our dwindling resources. SOECs could prove particularly useful in the emerging hydrogen economy. Looking at Lanthanum Molybdate (La2Mo2O9 or LM9) as a more conductive electrolyte than the current industry standard Yttria Stabilised Zirconia in SOFCs could improve this technology. LM9 undergoes an unwanted phase change (from monoclinic to cubic at ˜850K) when heating up to operating temperatures (1000K – 1120K). This work aims to stabilise the high-temperature phase of LM9 at room temperature via doping and confirm the structure of the resultant system with high-resolution ambient PXRD from the ESRF ID-31 beamline.

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