Preparation and characterisation of Ru doped MgB$_2$ - DTU Orbit (18/01/2019)

Preparation and characterisation of Ru doped MgB$_2$

Samples with Mg$_{1-x}$Ru$_x$B$_2$ nominal stoichiometry were prepared by sintering at 800°C. The critical transition temperature decreases up to a substitution level of $x \approx 0.015$. A maximum solubility limit slightly in excess of 1 at.% Ru for Mg is confirmed by energy dispersive spectroscopy measurements. From and beyond this limit, an unidentified phase appears in the X-ray diffraction patterns. Interestingly, the lattice parameters of the MgB$_2$ phase are constant up to $x = 0.015$, but start to decrease for higher Ru contents. This feature could be related to the fact that a Mg–Ru impurity phase results in a Mg-deficient (Mg,Ru)B$_2$ matrix.

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