Electronic Supplementary Information

Figure S1 – Sc$_2$Mo$_3$Si$_4$. The Rietveld refinement of Sc$_2$Mo$_3$Si$_4$ (82 wt%) along with the three impurity phases Mo$_5$Si$_3$ (6 wt%), MoSi$_2$ (9 wt%) and Sc$_2$O$_3$ (3 wt%). For clarity, only the main phase Bragg positions are indicated.

Figure S2 – Lu$_2$Mo$_3$Si$_4$. The Rietveld refinement of Lu$_2$Mo$_3$Si$_4$ (91.6 wt%) along with the impurity phases LuSi$_2$ (4.3 wt%), Mo$_5$Si$_3$ (1.5 wt%), Mo$_3$Si (1.5 wt%) and Lu$_2$O$_3$ (1.1 wt%). For clarity, only the main phase Bragg positions are indicated.

Figure S3 – Y$_2$Mo$_3$Si$_4$. The Rietveld refinement of Y$_2$Mo$_3$Si$_4$ (61 wt%) along with the impurity phases Mo$_5$Si$_3$, YSi$_2$ and Y$_2$O$_3$. For clarity, only the main phase Bragg positions are indicated.
Figure S3 – $Y_2Mo_3Si_4$. The Rietveld refinement of $Y_2Mo_3Si_4$ (61 wt%) along with the three impurity phases $Mo_5Si_3$ (21 wt%), $YSi_2$ (10 wt%) and $Y_2O_3$ (8 wt%). For clarity, only the main phase Bragg positions are indicated.

Figure S4 – $Sc_2W_3Si_4$. The Rietveld refinement of $Sc_2W_3Si_4$ (88.5 wt%) along with the two impurity phases $WSi_2$ (10.8 wt%) and $W$ (0.7 wt%). For clarity, only the main phase Bragg positions are indicated.