

Supporting information for:

The ternary borides Cr_2AlB_2 , Cr_3AlB_4 and Cr_4AlB_6 – the first members of the series $(\text{CrB}_2)_n\text{CrAl}$ with $n = 1, 2, 3$ and a unifying concept for ternary borides as *MAB*-phases

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S1-S7: powder XRD patterns (Cu-K α) of MAB phases with calculated patterns, reflections and Miller Indices given on top and measured patterns at the bottom. Impurity phases are indicated by symbols.

Figure S1: **Cr₂AlB₂**, (*) CrB (oC8, *Cmcm*, ICSD No.: 44249, ICDD PDF No. 089-3587).

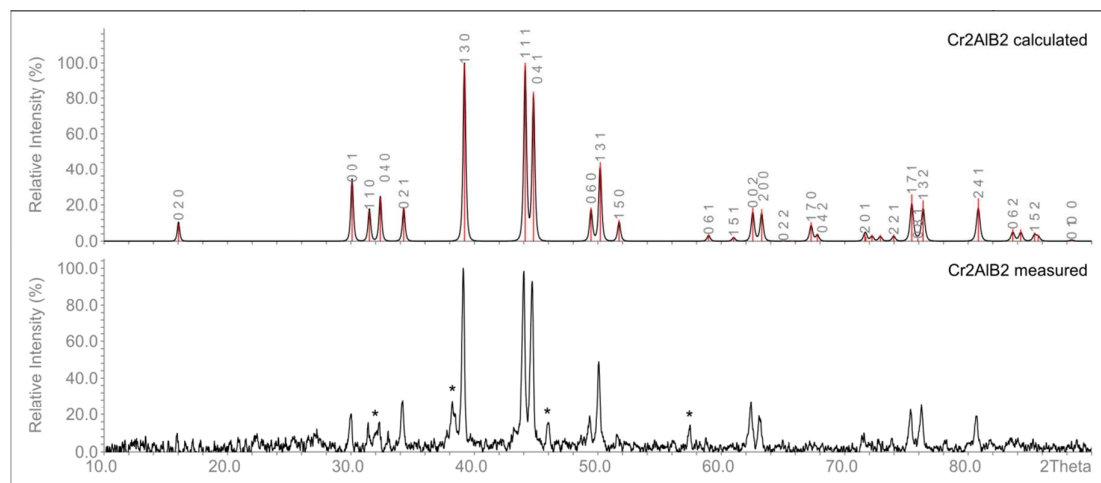


Figure S2: **Cr₃AlB₄**

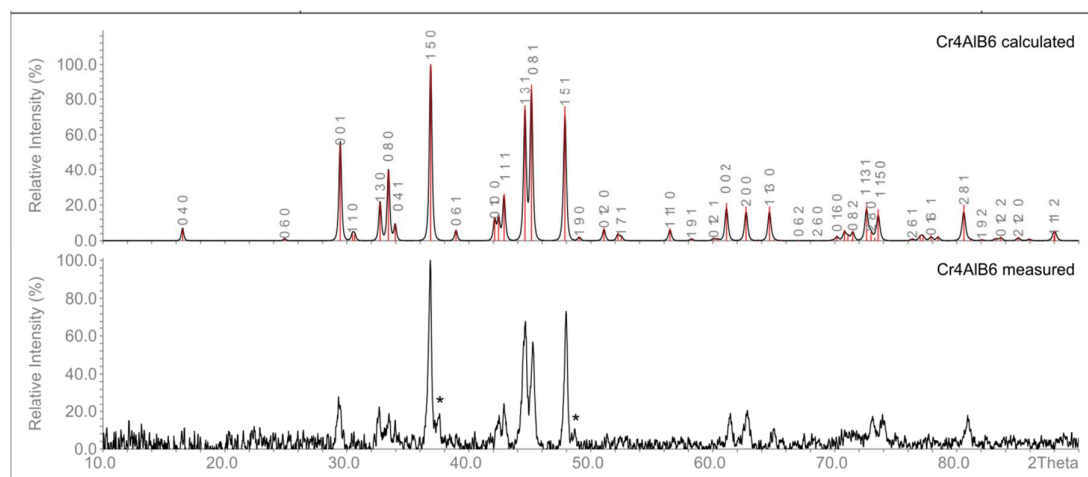


Figure S3: **Cr₄AlB₆**, (*) Cr₃AlB₄.

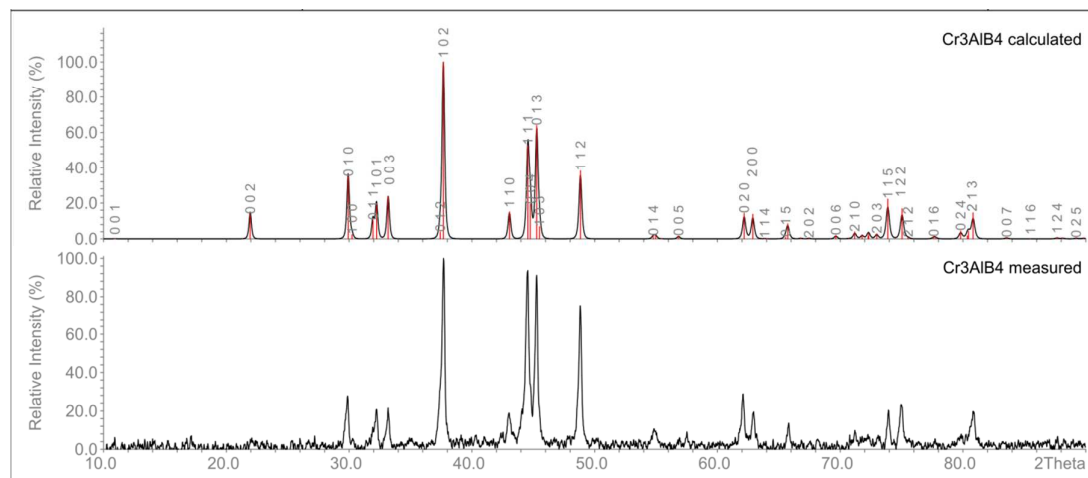


Figure S4: **Mn₂AlB₂**, (*) MnAl₆ (oS28, *Cmcm*, ICSD No. 57973; ICDD PDF No. 71-5858), (o) Al_{0.9}B₂ (hP3, *P6/mmm*, ICSD No. 99639, ICDD PDF No. 74-4445).

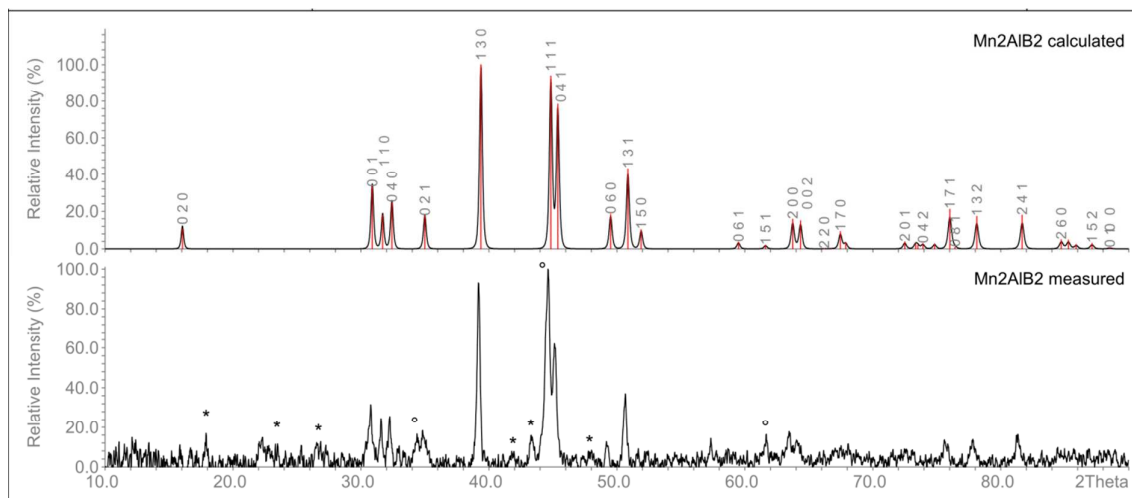


Figure S5: **Fe₂AlB₂**, (*) Fe₄Al₁₃, mS102, *C2/m*, ICSD No. 151129, ICDD PDF No. 73-3008;

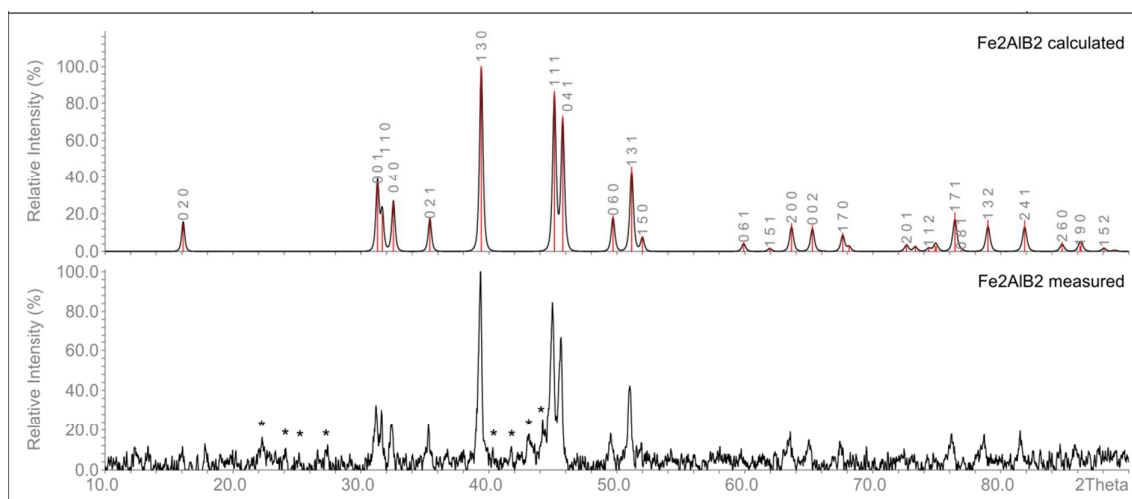
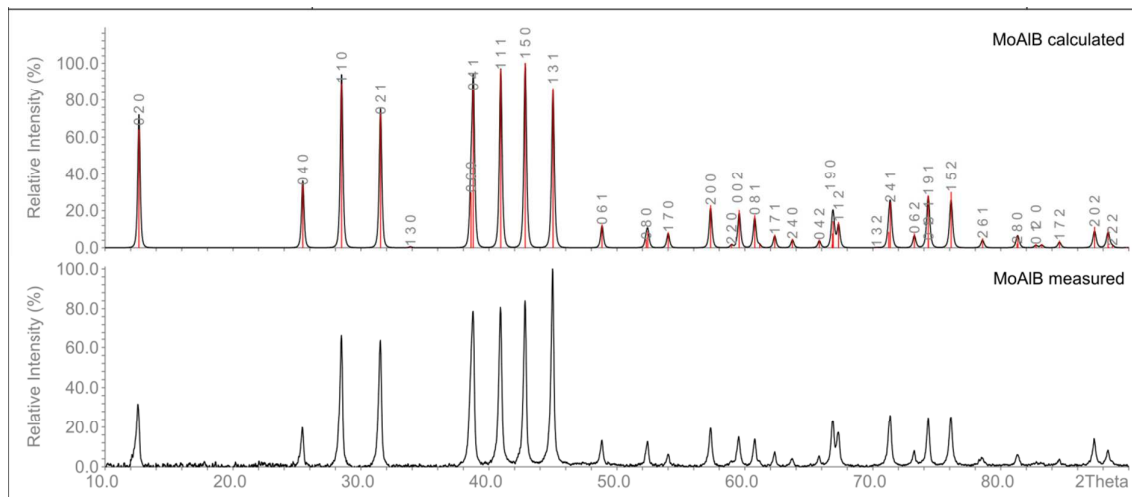


Figure S6: **MoAlB**



S7: **WAIB**; on top: WB calculated (tl16, I_{41}/amd , ICSD No. 424240) middle: WAIB calculated; bottom: WAIB sample measured, (*) Al_2O_3 from crucible (hR10, $R\bar{3}c$, ICSD No. 26790; ICDD PDF No. 74-1081), (o) SiO_2 (quartz, from agate mortar, $hP9$, $P3_121$, ICSD No. 29210, ICDD PDF No. 85-0865).

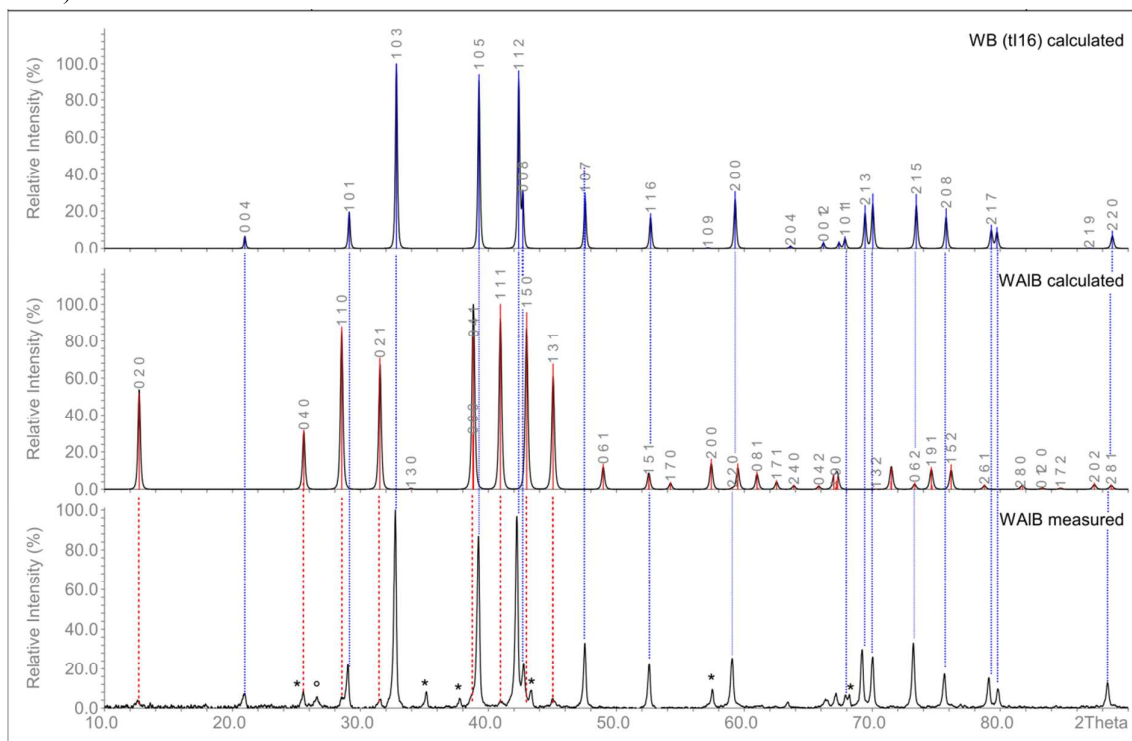
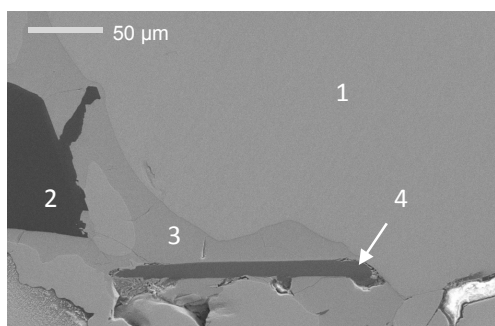
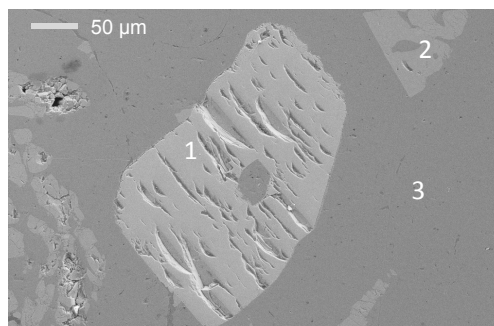


Figure S8: SEM pictures of polished samples – phase identification by EDX:



Fe_2AlB_2

- 1: Fe_2AlB_2
- 2: AlB_{12}
- 3: Fe_4Al_{13}
- 4: $(Al,Fe)B_2$



Mn_2AlB_2

1. Mn_2AlB_2 (with inclusion of Al)
2. $MnAl_6$
3. Al