SUPPLEMENTARY INFORMATION
High-pressure properties of TiP_2O_7, ZrP_2O_7 and ZrV_2O_7

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Fig. 4. High-pressure diffraction patterns of TiP_2O_7. (a) 0.05 – 5.79 GPa. Pressure medium was methanol-ethanol (4:1). (b) 6.28 – 40.3 GPa. Pressure medium was nitrogen. Peaks that have a contribution from δ-N_2 (below 18.7 GPa) and ϵ-N_2 (18.7 GPa and higer pressures) are indicated with triangles.

Fig. 5. High-pressure diffraction patterns of ZrP_2O_7. (a) 0.14 – 8.34 GPa. Pressure medium was methanol-ethanol (4:1), and for clarity only every second collected pattern is shown. (b) 4.17 – 20.5 GPa. Peaks that have a contribution from δ-N_2 and ϵ-N_2 (20.5 GPa) are indicated with triangles. Stars represent peaks due to the stainless steel gasket.

Fig. 6. Powder diffraction patterns for ZrV_2O_7. The diagram should be viewed from bottom to top. The pressure induced transition, α – β ZrV_2O_7 is shown to be fully reversible.

Fig. 7. Powder diffraction profile fits of TiP_2O_7. (a) At 0.05 GPa with methanol-ethanol (4:1) as pressure medium. (b) At 18.7 GPa with nitrogen as pressure medium.

Fig. 8. Powder diffraction profile fits of ZrP_2O_7. (a) At 1.69 GPa with methanol-ethanol (4:1) as pressure medium. (b) At 11.0 GPa with nitrogen as pressure medium.

Fig. 9. Powder diffraction profile fits of ZrV_2O_7. Pressure medium was methanol-ethanol (4:1). (a) α-ZrV_2O_7 at 0.15 GPa. (b) β-ZrV_2O_7 at 2.97 GPa, fitted using the small tetragonal unit-cell. (c) β-ZrV_2O_7 at 2.97 GPa, fitted using the large orthorhombic supercell.

SUPPLEMENTARY INFORMATION

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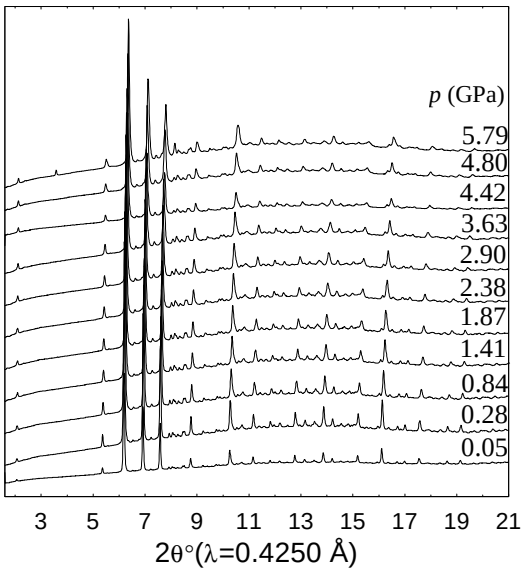
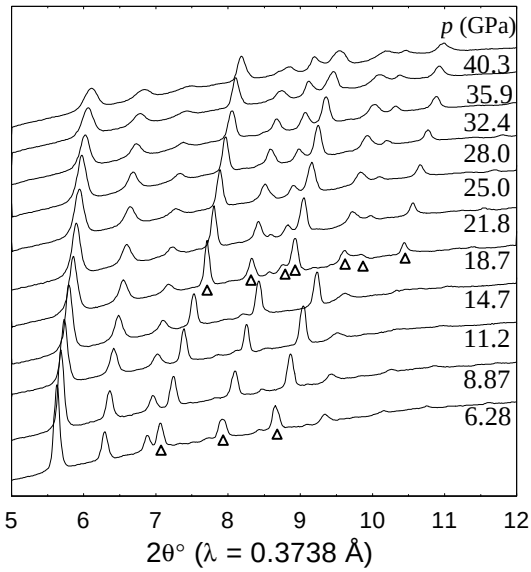
Stefan Carlson and Anne Marie Krogh Andersen

Figure 4.

4a



4b



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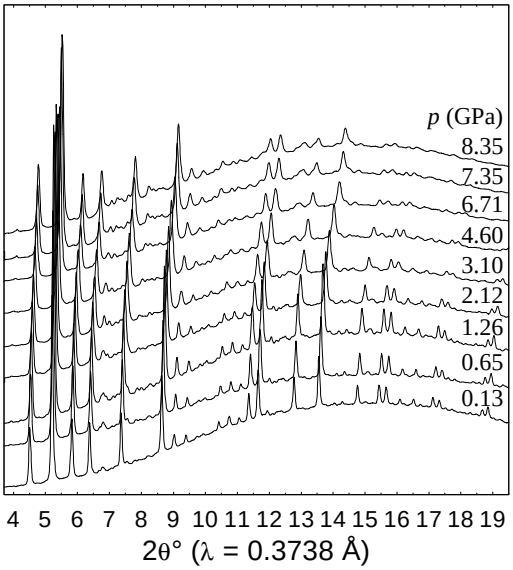
Stefan Carlson and Anne Marie Krogh Andersen

Figure 5

5a



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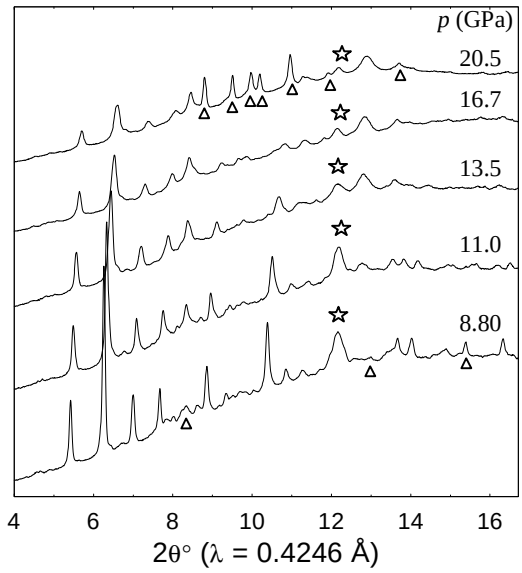

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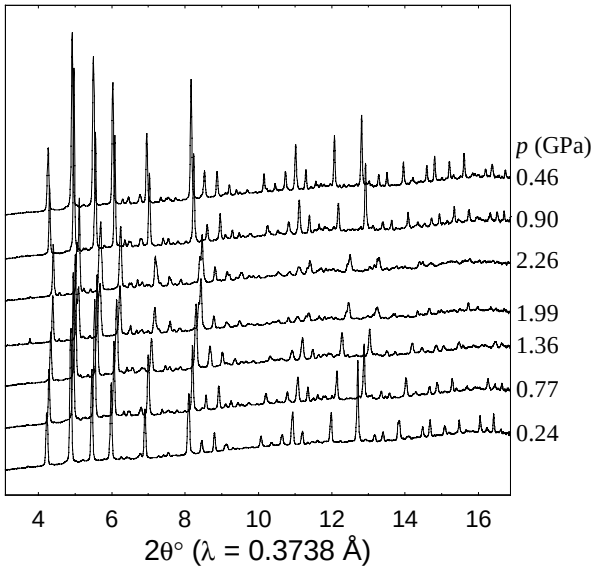
Stefan Carlson and Anne Marie Krogh Andersen

Figure 6



SUPPLEMENTARY INFORMATION
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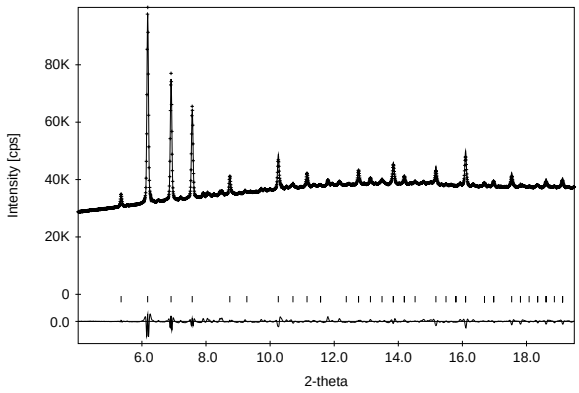
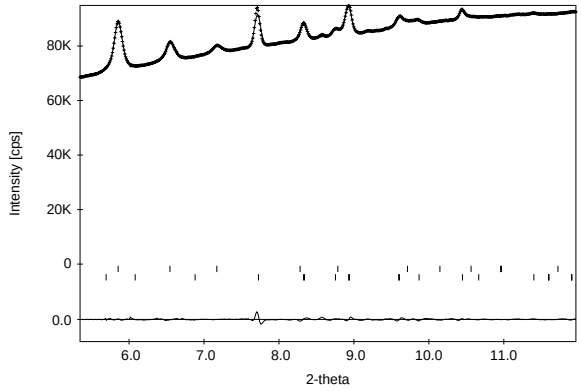
Stefan Carlson and Anne Marie Krogh Andersen

Figure 7



(a)



(b)

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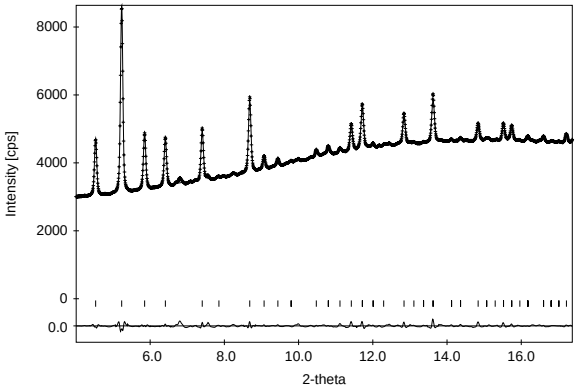
Stefan Carlson and Anne Marie Krogh Andersen

Figure 8



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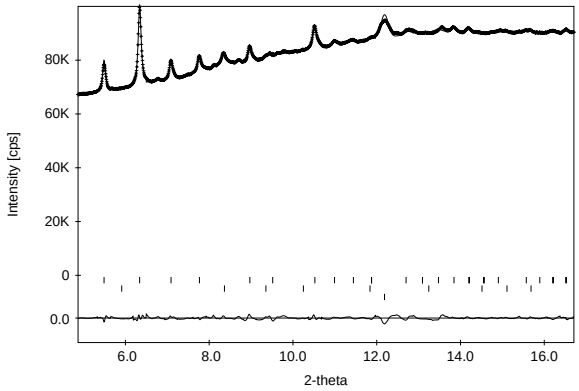

(b)

SUPPLEMENTARY INFORMATION
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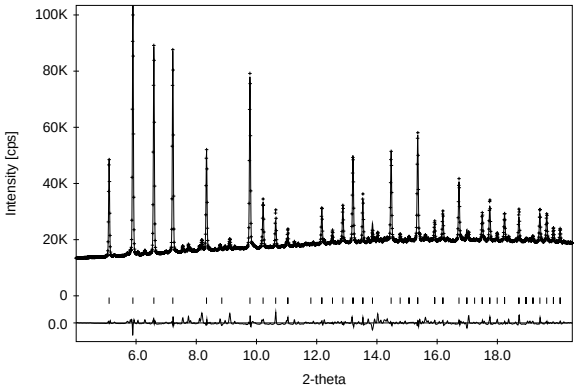
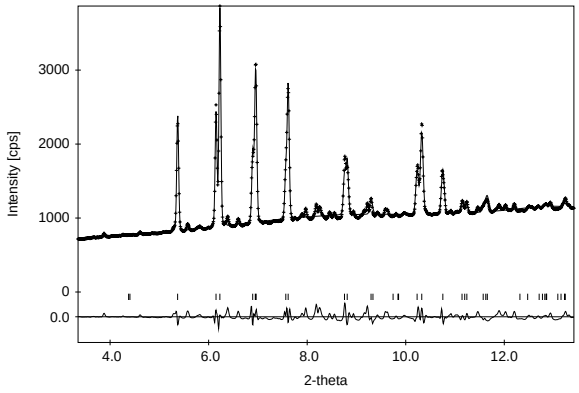
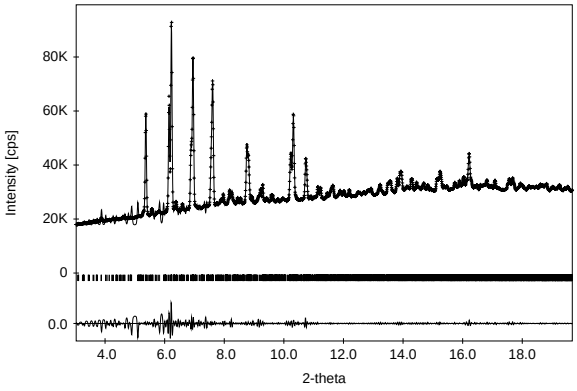
Figure 9



(a)



(b)



(c)