Supporting Information

Thermal decomposition of sodium amide, $NaNH_2$, and sodium amide hydroxide composites, $NaNH_2$–NaOH

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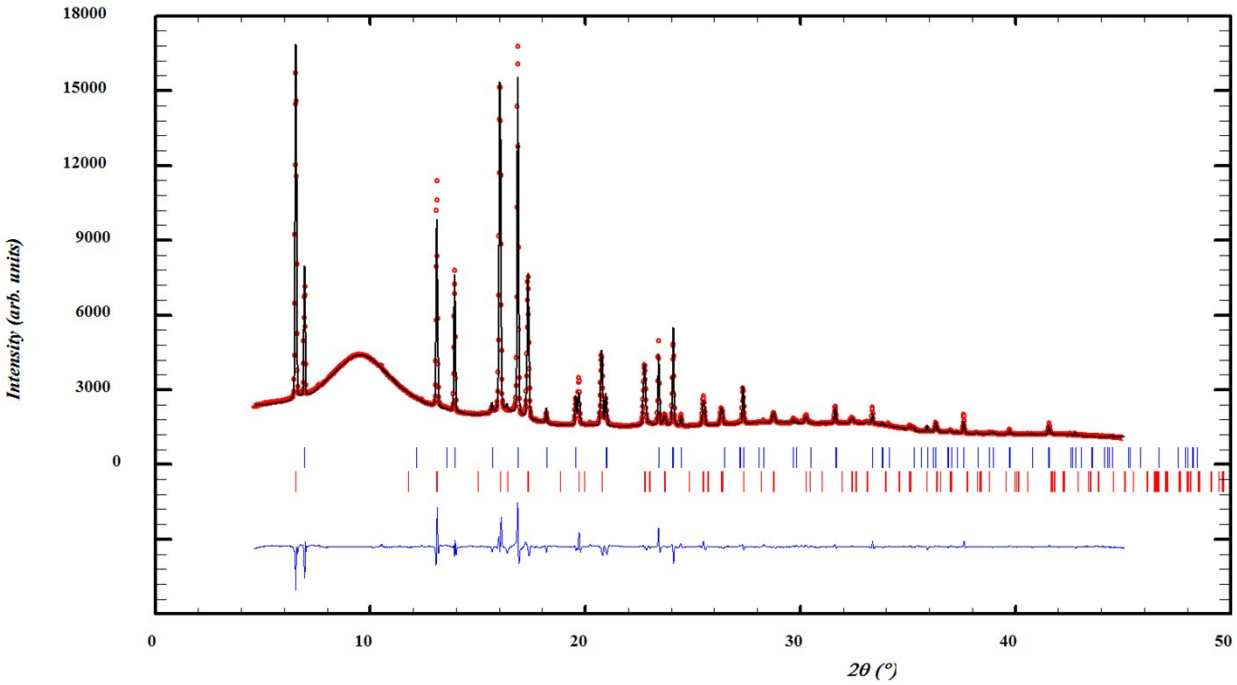

Figure S1 Rietveld refinement of SR-PXD data for $0.33NaNH_2$-$0.67NaOH$ (s12) measured at 177 °C, λ = 0.69449 Å. Tic marks NaOH, 31.8 wt% (top) and $Na(OH)_{1-x}(NH_2)_x$, 68.2 wt%. The following agreement factors were obtained for $Na(OH)_{1-x}(NH_2)_x$: R_B = 4.95 %, R_F = 6.63 %, R_p = 1.73 %, R_{wp} = 2.99 % (not corrected for background) and $\chi^2 = 0.204 \cdot 10^4$ (this value is high because of the very high counting statistics accumulated by the 2D detector).

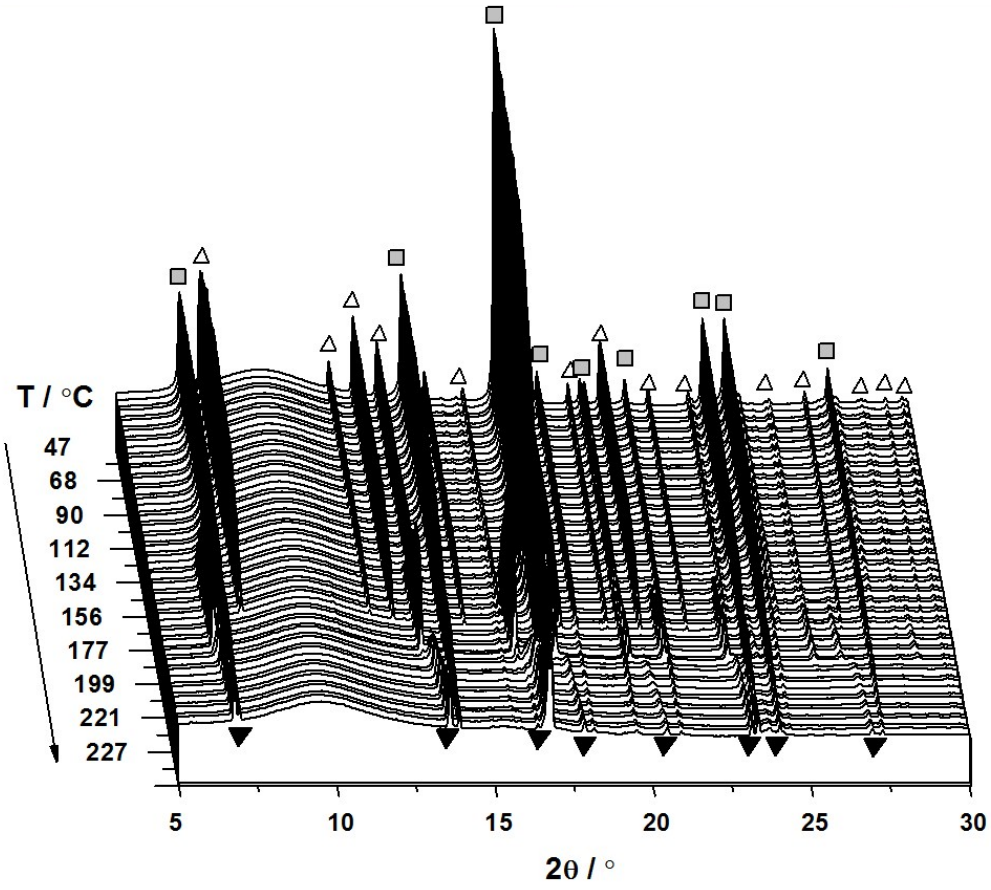

Figure S2 *In-situ* SR-PXD of $0.33NaNH_2$-0.67NaOH (s12) during heating from RT to 250 °C (5 °C/min, λ = 0.69449 Å). The temperature difference between each PXD pattern is approx. 2 °C. A zoom of this data in the 2θ range 6.3° to 7.8° is shown in Figure 1a. Symbols: △ $NaNH_2$; □ NaOH; ▲$Na(OH)_{1-x}(NH_2)_x$.

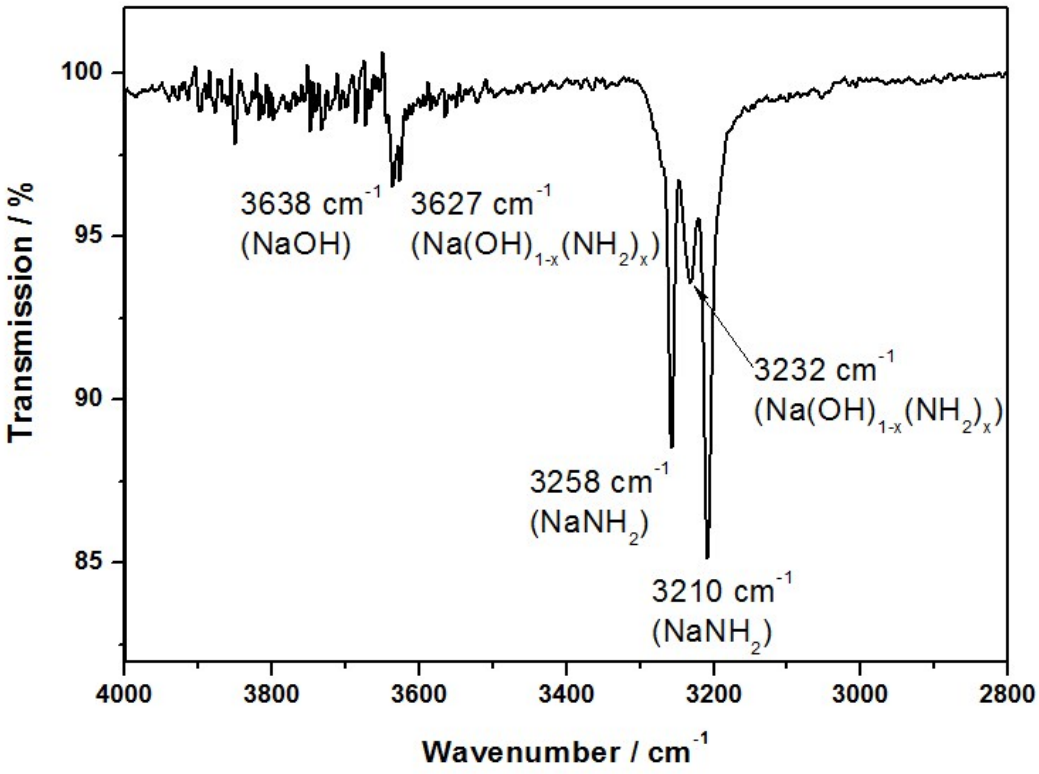

Figure S3 FTIR spectrum collected at RT for $0.70NaNH_2$-0.30NaOH (s8) heated to 160 °C.

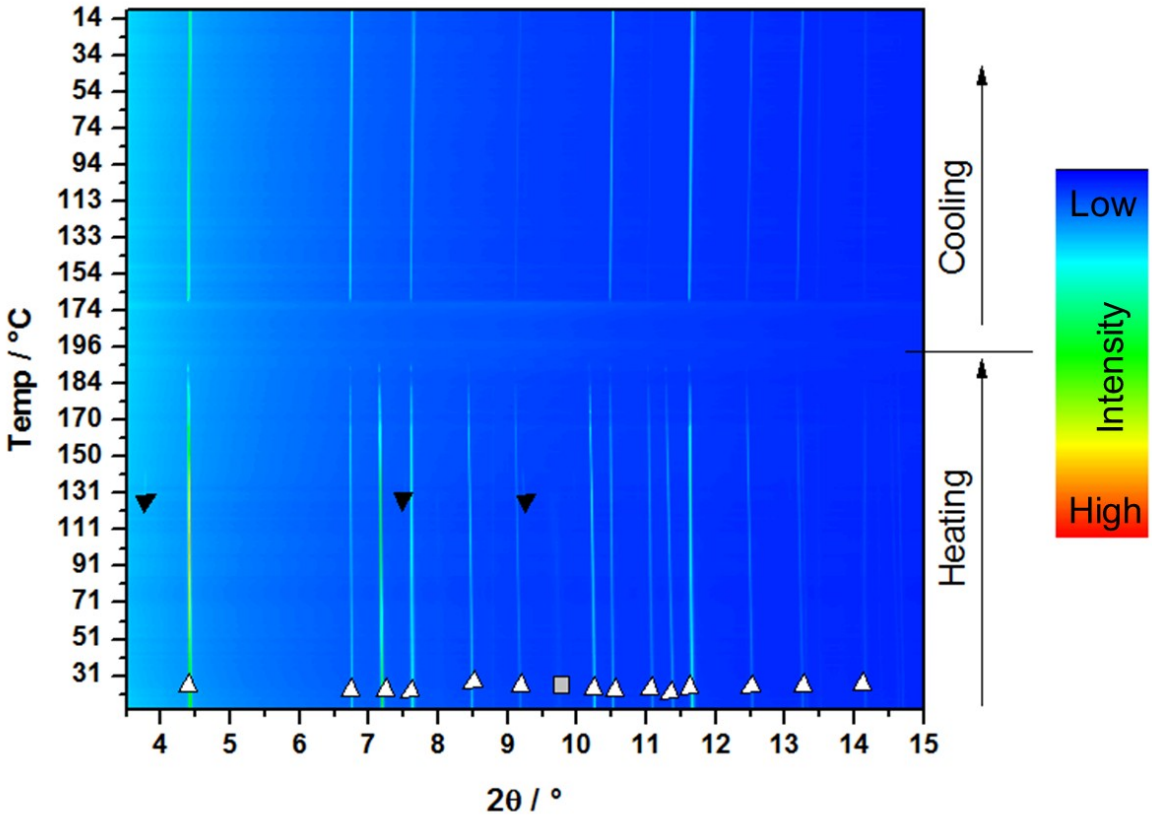

Figure S4 *In-situ* SR-PXD of $NaNH_2$ (s2) measured during heating from RT to 200 °C and subsequent cooling to RT (± 5 °C/min, λ = 0.39997 Å). Symbols: △ $NaNH_2$; □ NaOH;▼$Na(OH)_{1-x}(NH_2)_x$.

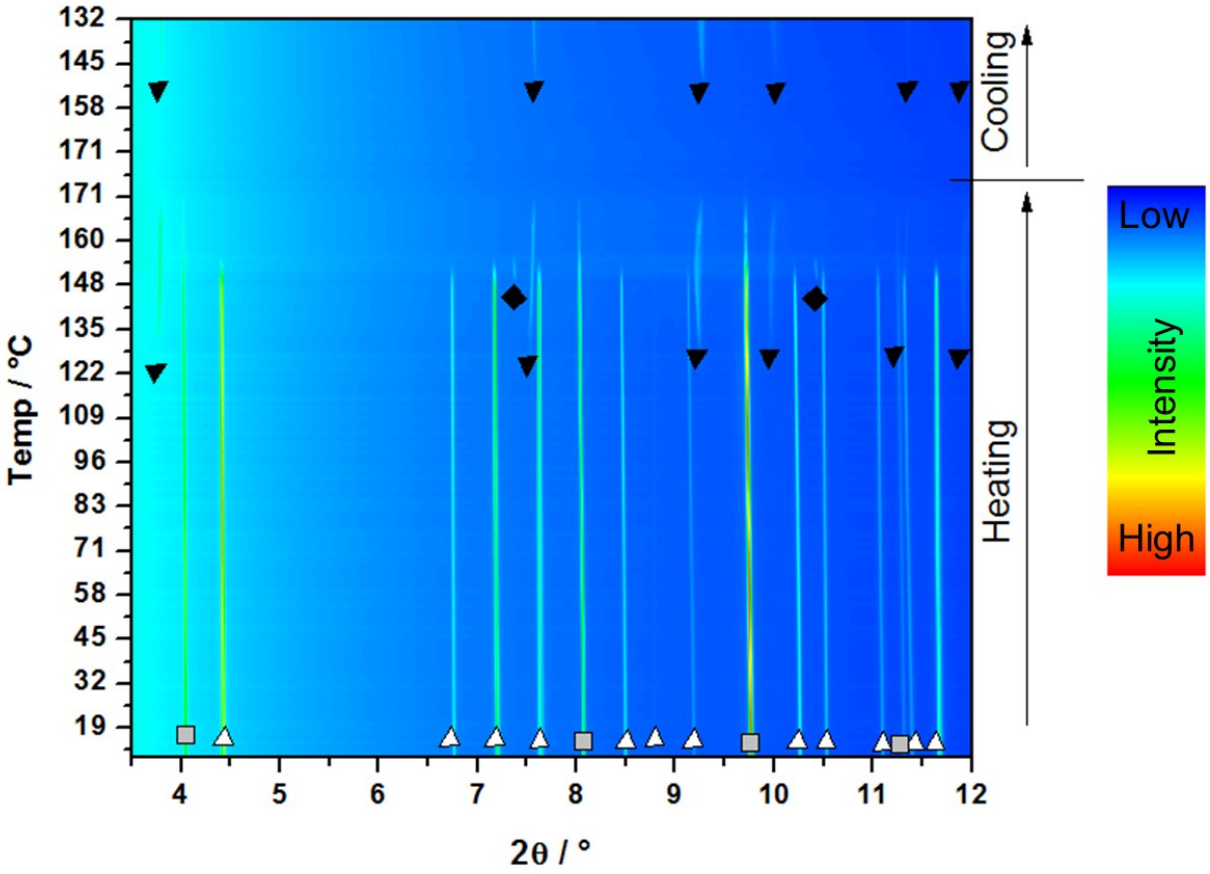

Figure S5*In-situ* SR-PXD of 0.60$NaNH_2$-0.40NaOH (s10) measured during heating from RT to 175 °C and subsequent cooling to RT (± 5 °C/min, λ = 0.39997 Å). Symbols: △ $NaNH_2$; □ NaOH; ▼$Na(OH)_{1-x}(NH_2)_x$;■ **u1**.

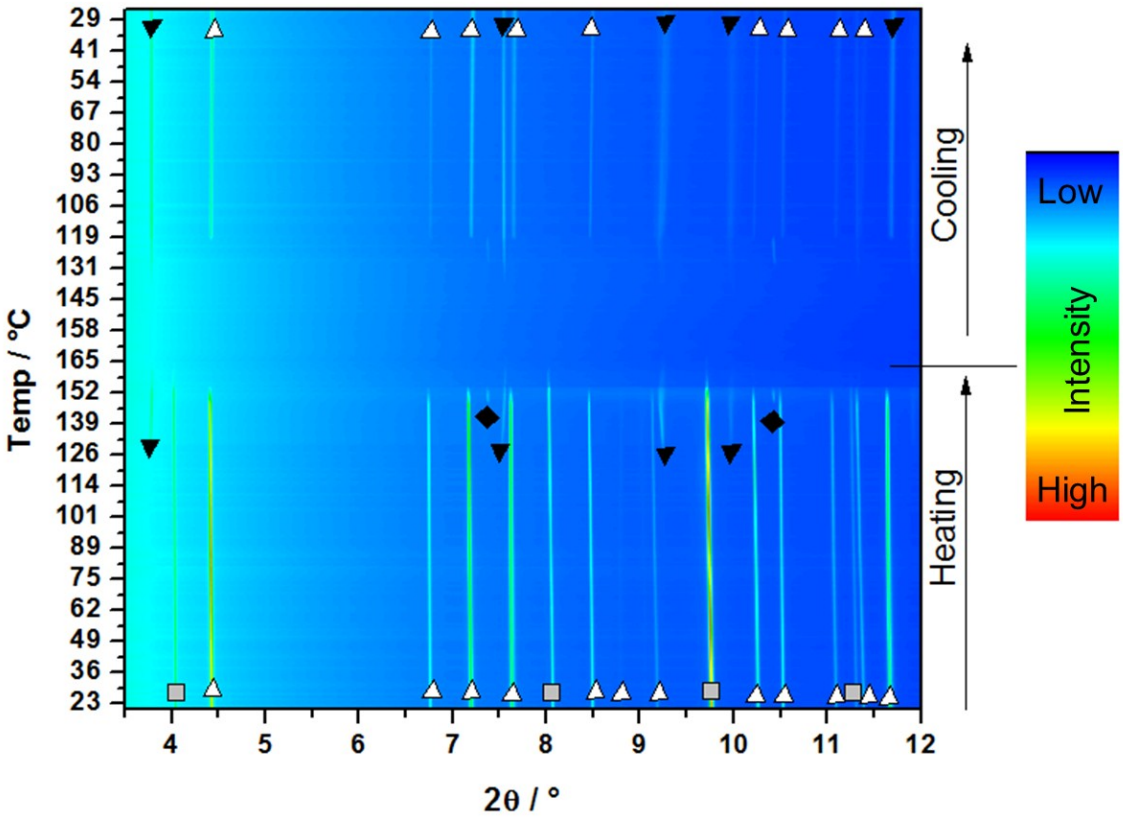

Figure S6 *In-situ* SR-PXD of $0.72NaNH_2$-0.28NaOH (s7) measured during heating from RT to 175 °C and subsequent cooling to RT (± 5 °C/min, λ = 0.39997 Å). Symbols: △ $NaNH_2$; □ NaOH; ▼$Na(OH)_{1-x}(NH_2)_x$;■ **u1**.

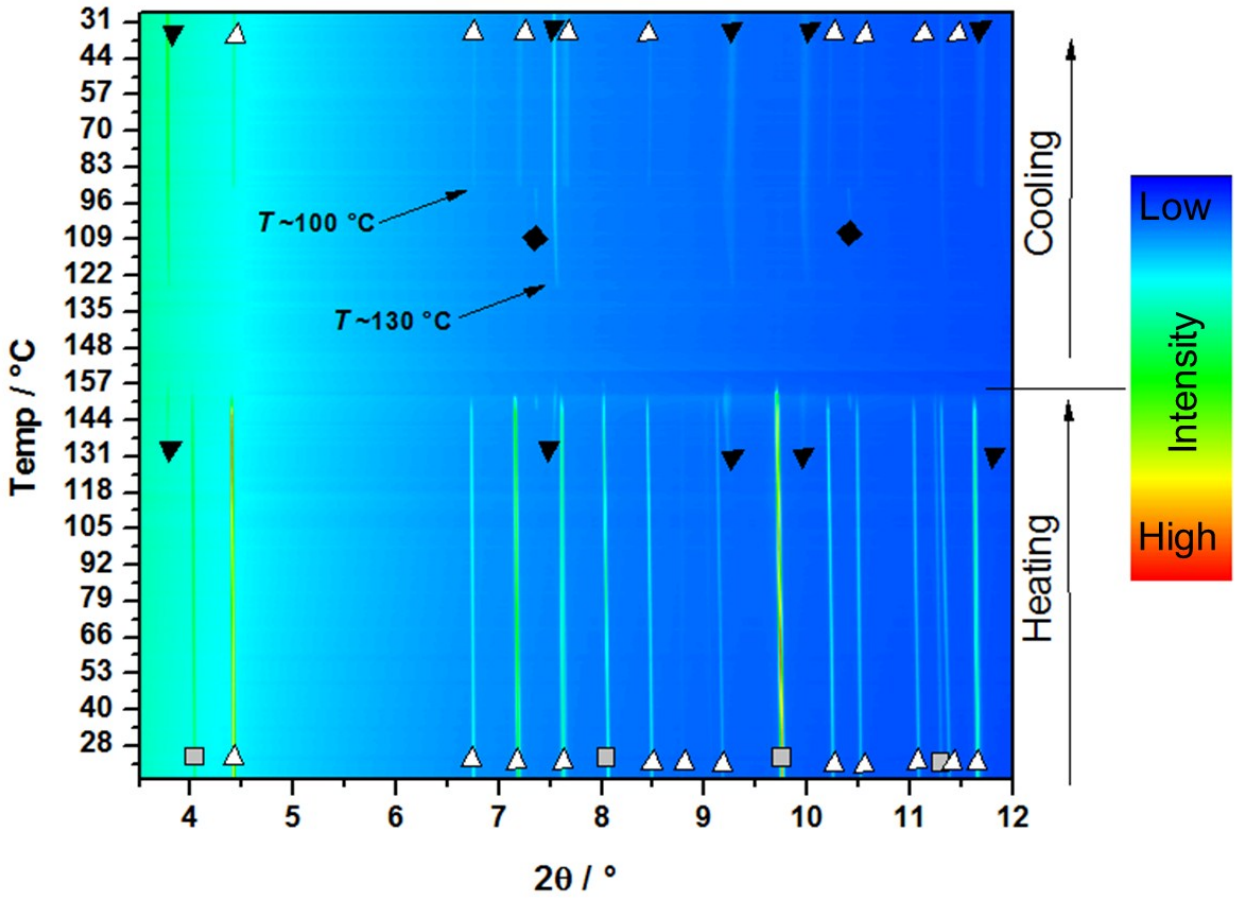

Figure S7 *In-situ* SR-PXD of 0.74$NaNH_2$-0.26NaOH (s6) measured during heating from RT to 165 °C and subsequent cooling to RT (± 5 °C/min, λ = 0.39997 Å). Symbols: △ $NaNH_2$; □ NaOH; ▼$Na(OH)_{1-x}(NH_2)_x$,■ **u1**.

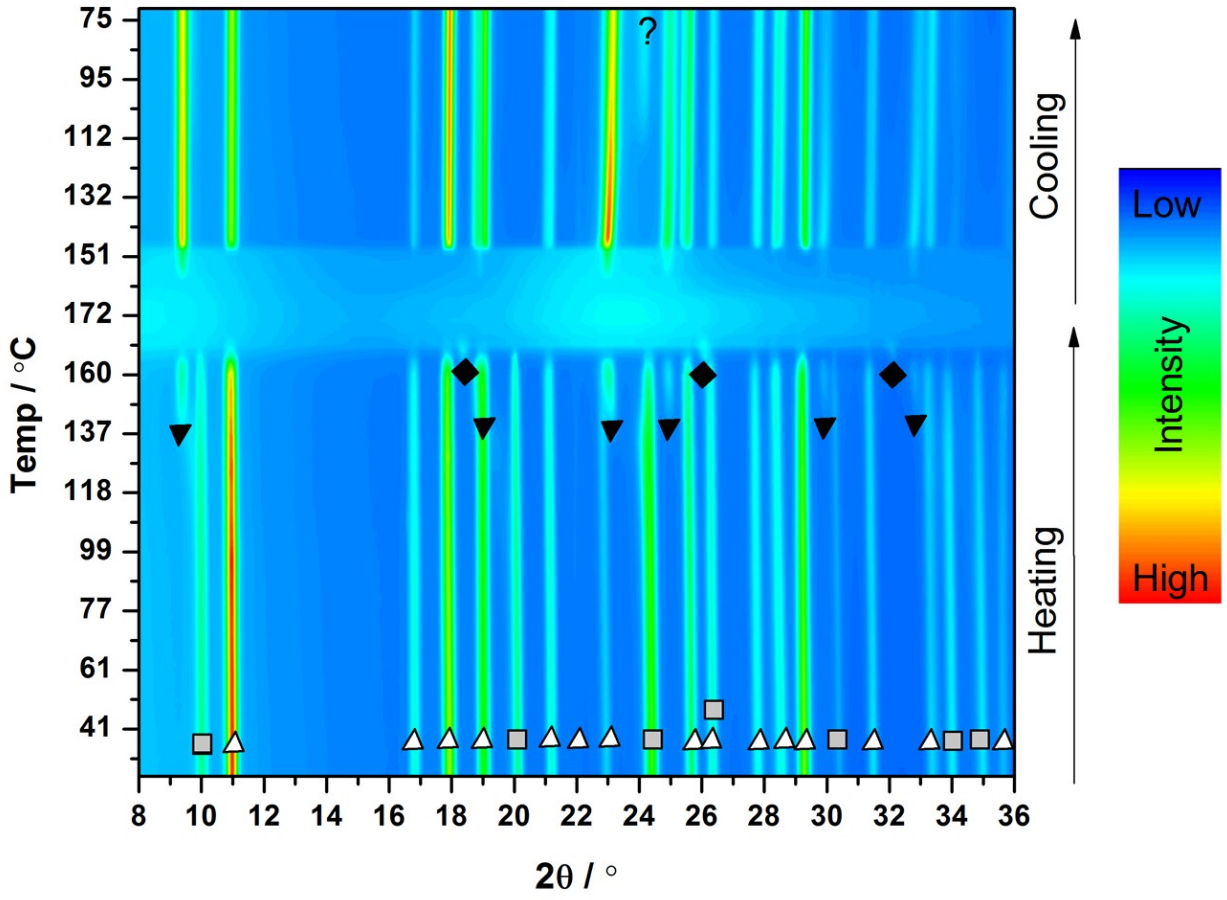

Figure S8 *In-situ* SR-PXD of 0.77$NaNH_2$-0.23NaOH (s5) measured during heating from RT to 175 °C and subsequent cooling to 75 °C (± 3.5 °C/min, λ = 0.9937 Å). Symbols: △ $NaNH_2$; □ NaOH; ▼$Na(OH)_{1-x}(NH_2)_x$; ■ **u1**.

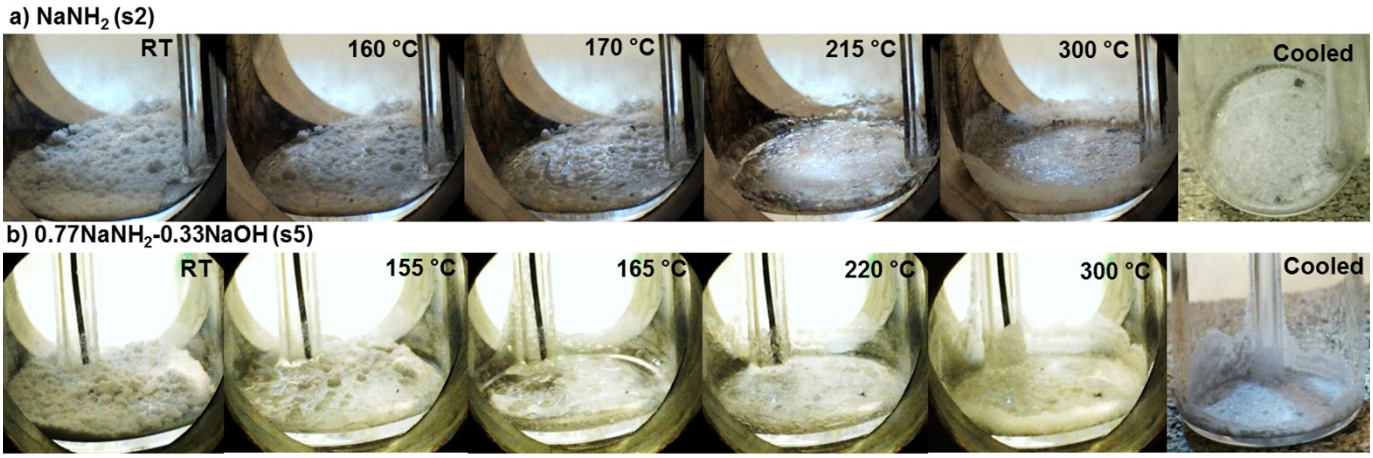

Figure S9 Temperature-programmed photographic analysis (TPPA) at 4 °C/min under argon atmosphere for xNaNH$_2$–(1-x)NaOH (x = 1 and 0.77, s2 and s5)

Figure S10 A picture of the glass tube after heating it with $NaNH_2$.