

Supporting Information

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**A Fast and Sustainable Route to Bassanite Nanocrystals
from Gypsum**

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Electronic Supplementary Information (ESI)

A fast and sustainable route to bassanite nanocrystals from gypsum

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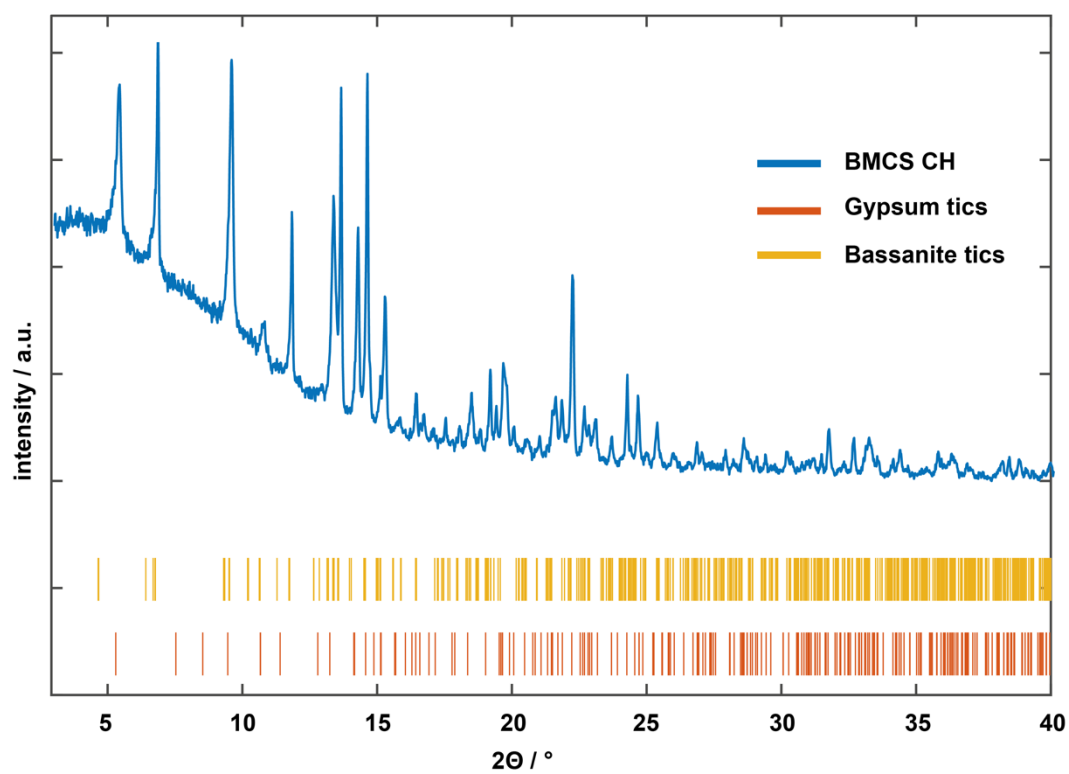


Figure S1. Magnified powder X-ray diffraction pattern of BMCS CH after 990 minutes of milling. In contrast to BMCS MeOH, the conversion to bassanite was not complete.

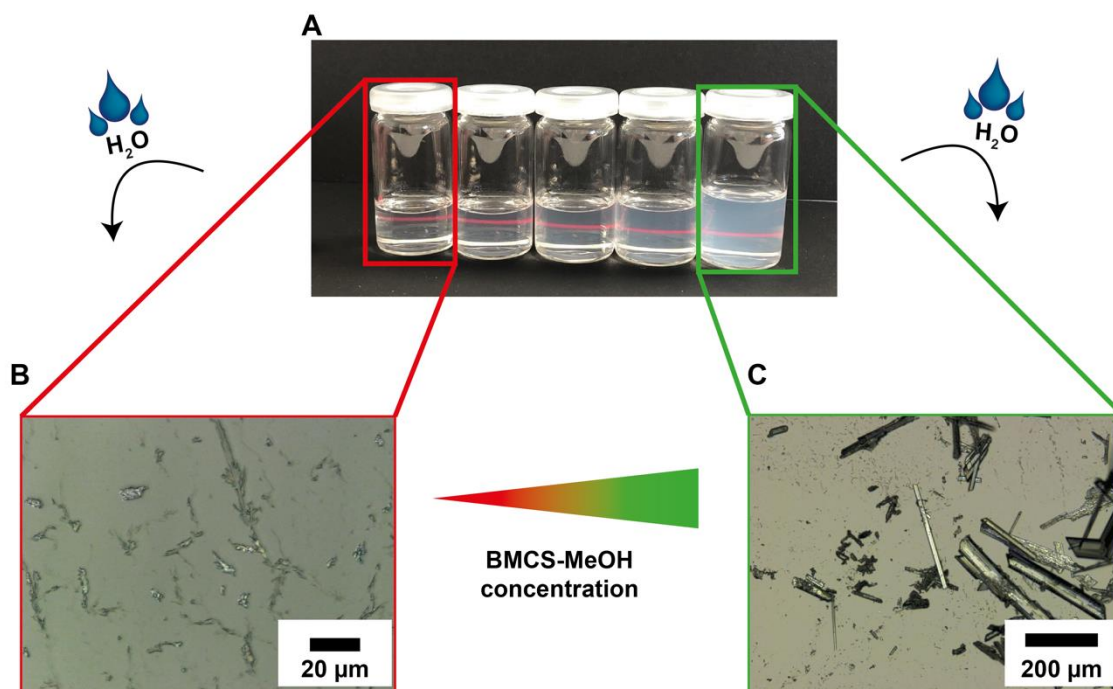


Figure S2. Miscibility of aCS-MeOH with ethylene glycol (A). Increasing the amount of aCS-MeOH leads to increased turbidity. Mixtures with low concentration lead to slower recrystallization and crystal growth (B), while mixtures with higher concentration lead to faster recrystallization and crystal growth after rehydration in water.

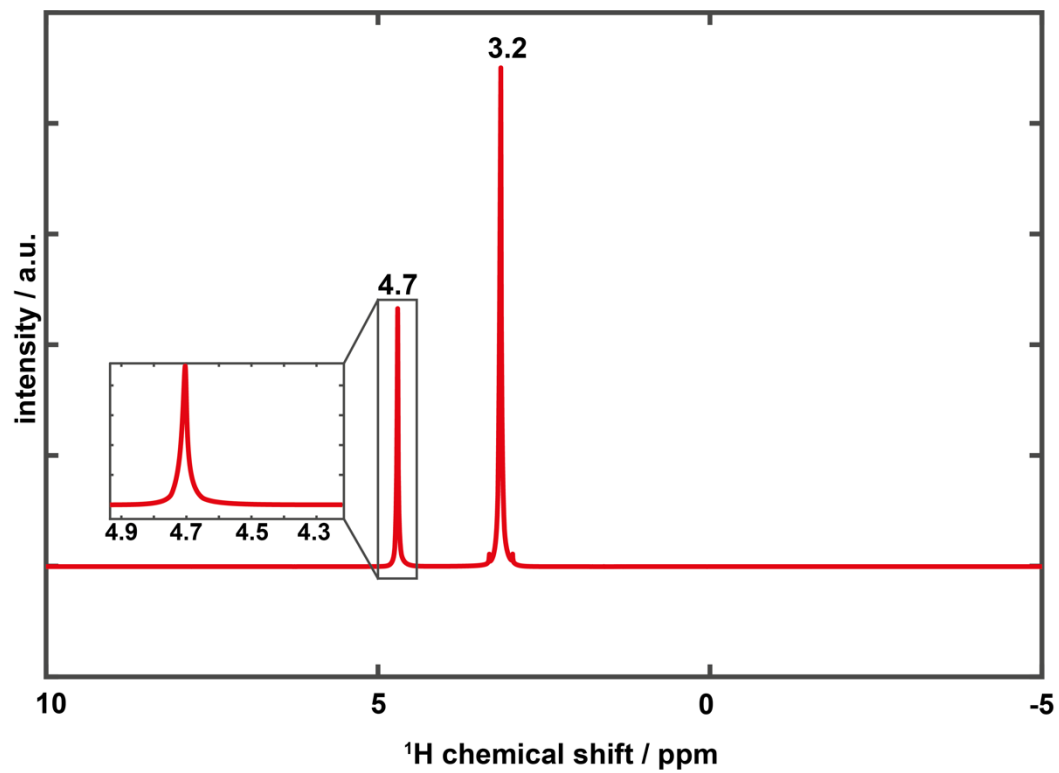


Figure S3. ^1H liquid NMR spectrum of pure methanol. Different from aCS-MeOH, no additional signal was observed at 4.4 ppm.

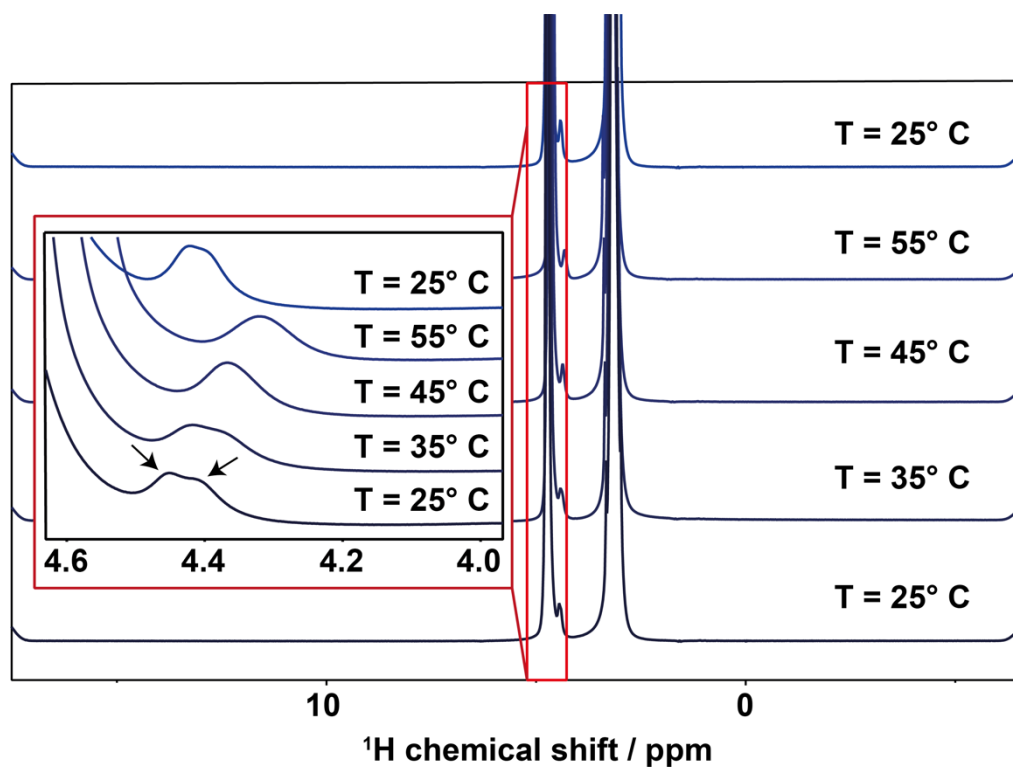


Figure S4. Evolution of ^1H liquid NMR spectra from BMCS MeOH at different temperatures. The insert shows two signals at 4.4 ppm, which merge at higher temperatures. After cooling, relaxation to the previous state occurs.

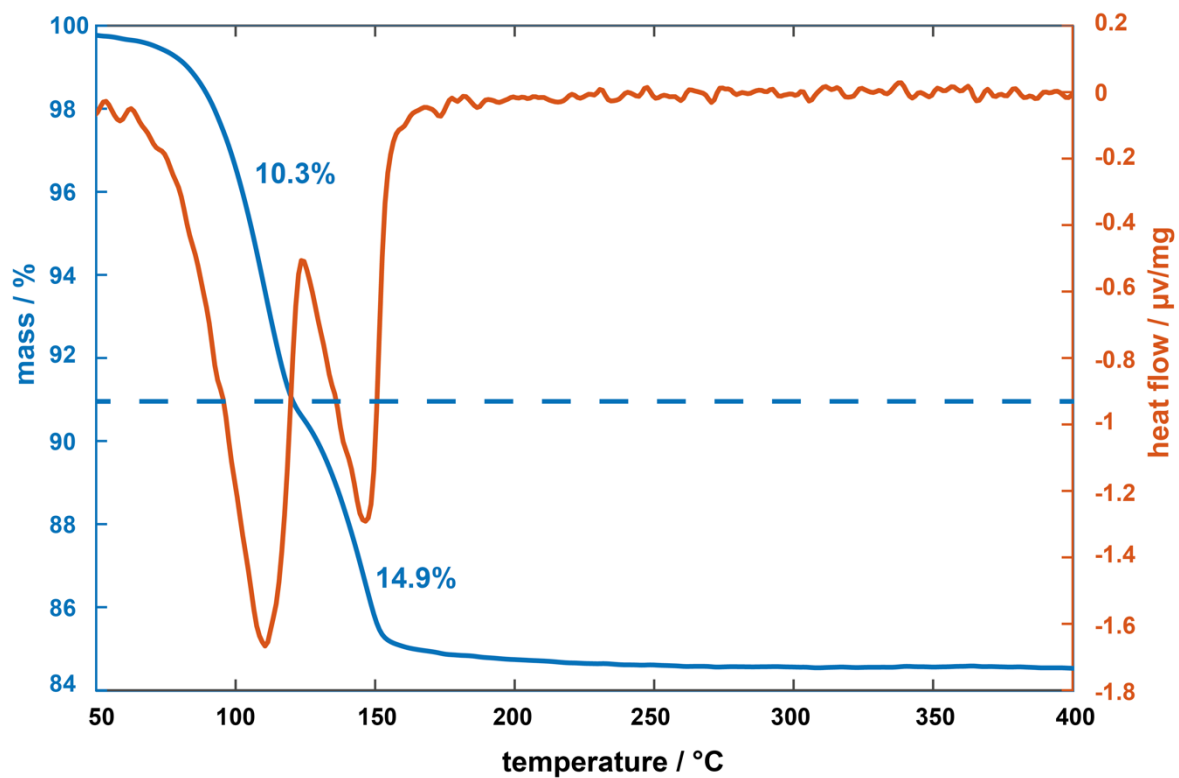


Figure S5. TGA (blue line) and DTA traces (red line) of gypsum powders after milling in cyclohexane.

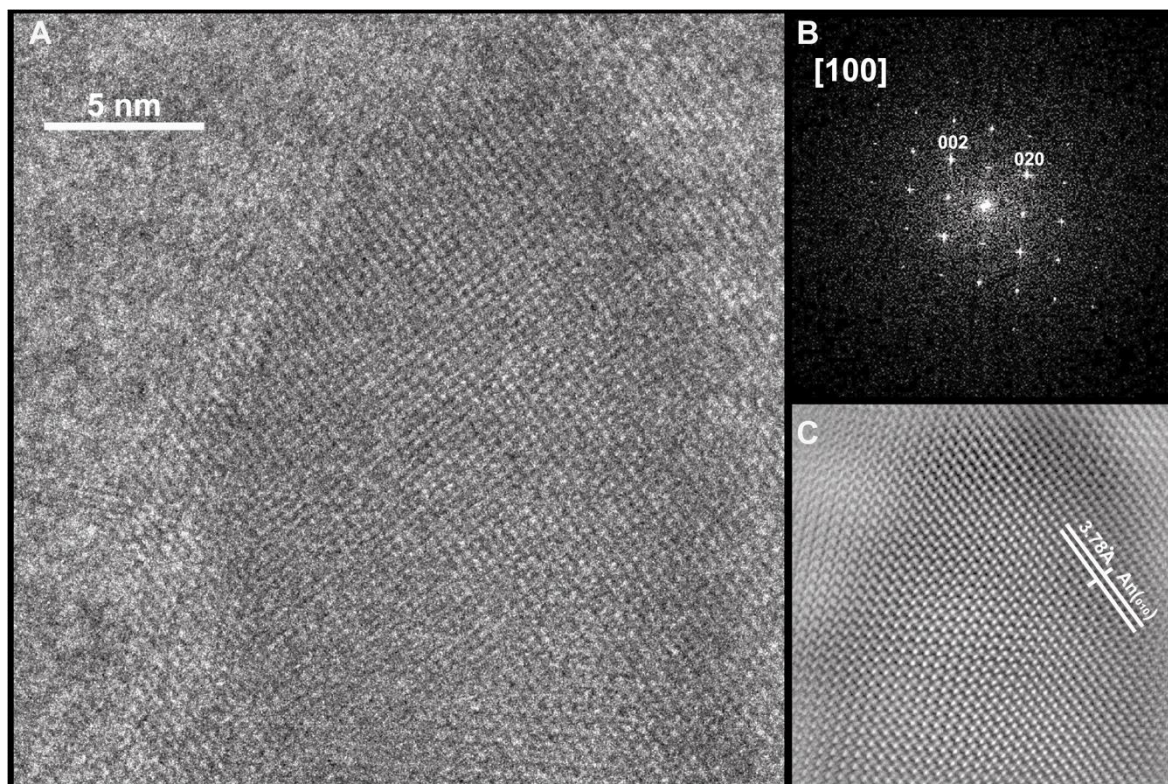


Figure S6. HR-TEM image (A) of an anhydrite nanocrystal from BMCS-MeOH showing that additional milling times might lead to higher degree of dehydration. The FFT (B) and reverse FFT show the high crystallinity of the nanocrystal.

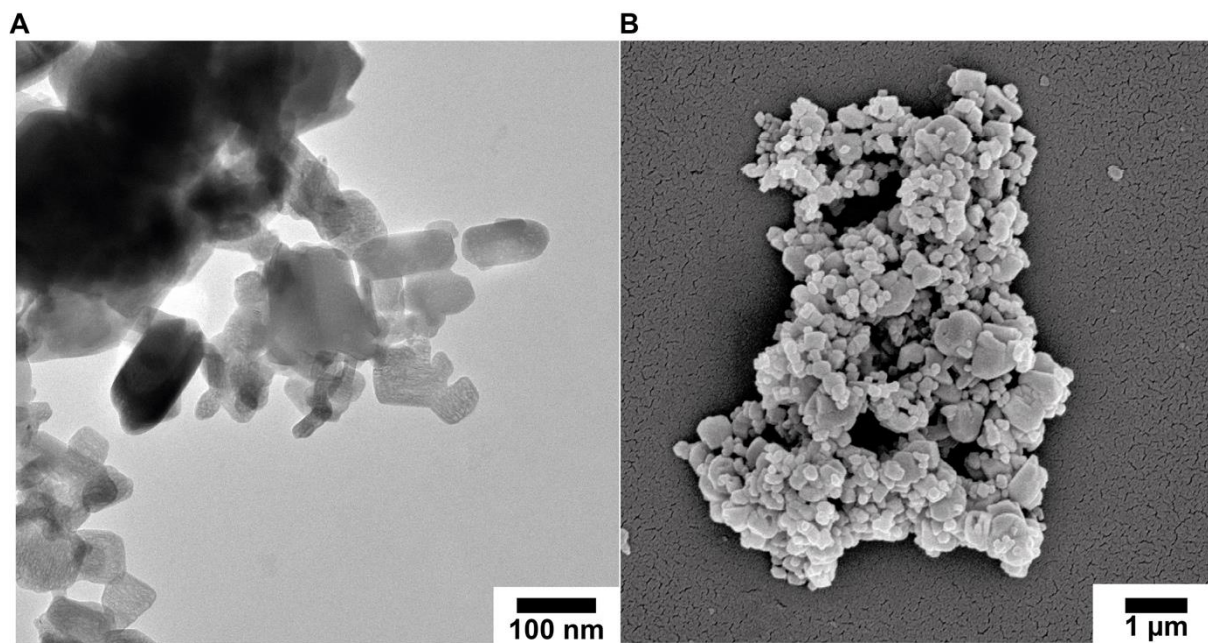


Figure S7. (A) TEM image and (B) SEM image of ball-milled gypsum in cyclohexane (BMCS CH). No special morphologies were observed. The material consists of agglomerated nanoparticles.

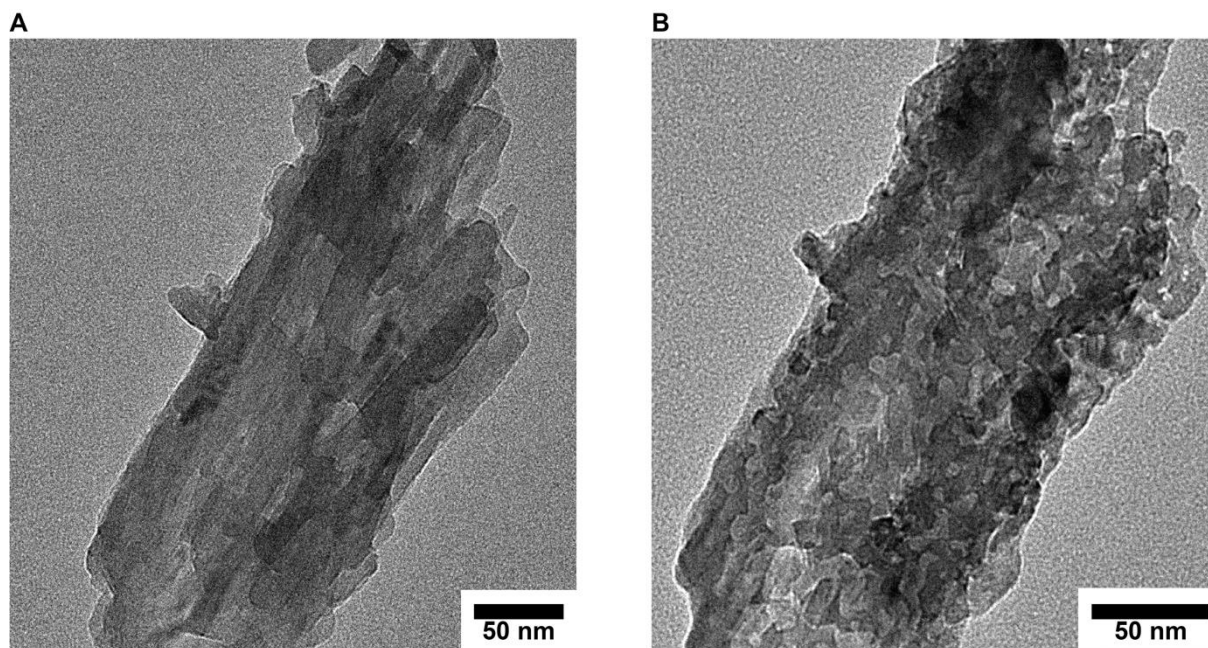


Figure S8. TEM images of BMCS MeOH after short irradiation (A) and after prolonged exposure (B). The material starts to decompose and the needle-like morphology is lost.