# Supplementary Material

# In Situ Microstructure Characterization of Potassium Di-Phosphate (KDP) Densification during Cold Sintering

**Andrew J. Allen [1,*], Russell A. Maier [1], Fan Zhang [1], Ivan Kuzmenko [2] and Jan Ilavsky [2]**

[1] Materials Measurement Science Division, National Institute of Standards and Technology, Gaithersburg, MD 20899, USA

[2] X-ray Science Division, Argonne National Laboratory, Argonne, IL 60439, USA

* Correspondence: andrew.allen@nist.gov; Tel.: +1-301-975-5982

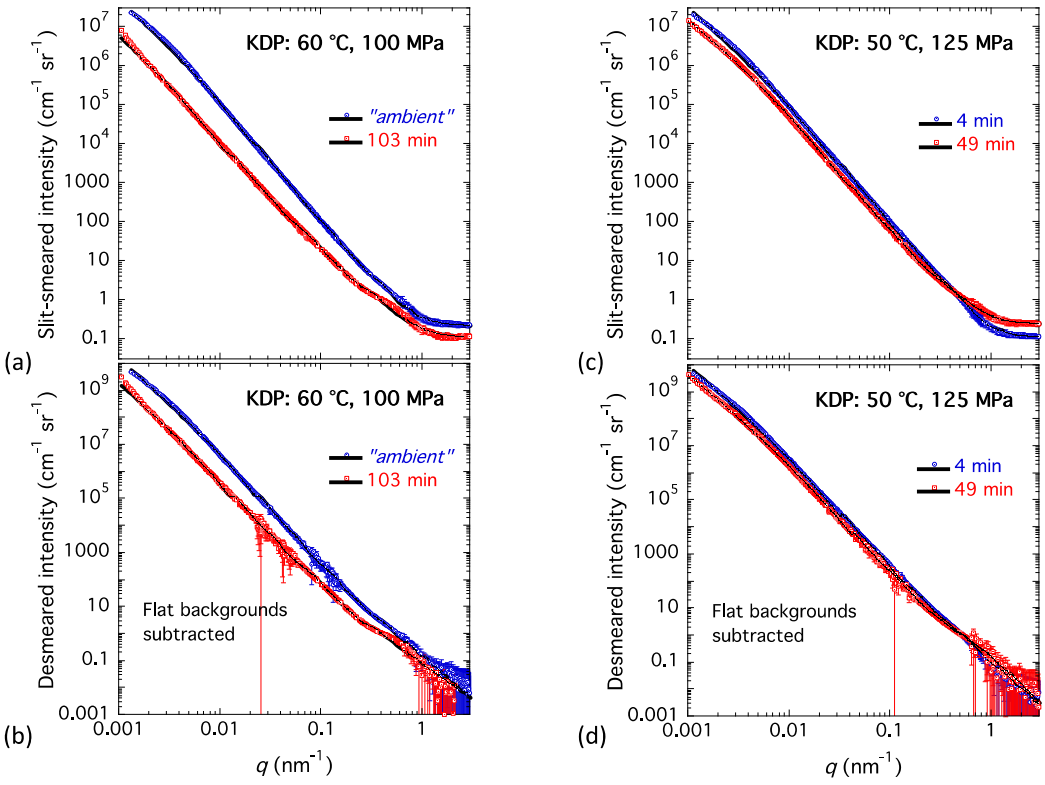


**Figure S1.** Typical slit-smeared and desmeared USAXS/SAXS data with model fits for (a,b) KDP subject to CSP at 60 °C with p = 100 MPa; (c,d) KDP subject to CSP at 50 °C with p = 125 MPa. Vertical bars indicate estimated standard uncertainties for reduced and intensity-calibrated data. Note the amplification of data scatter on desmearing.

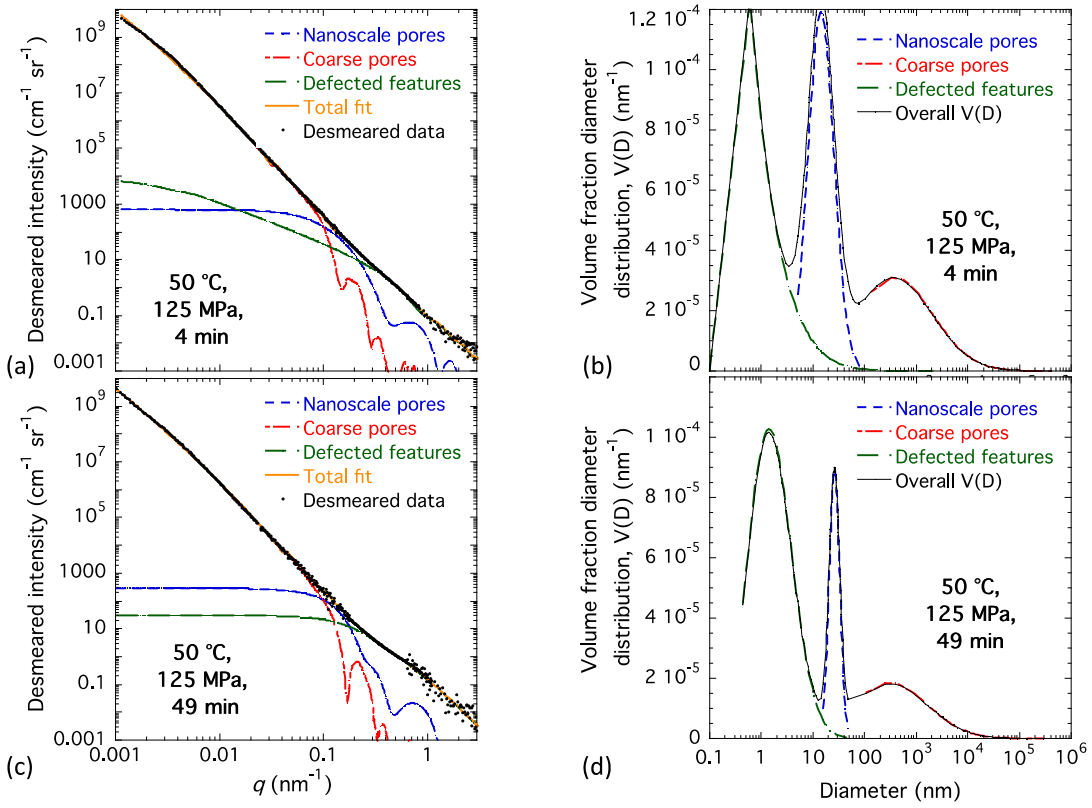


**Figure S2.** Breakdown of microstructural model contributions to fitted desmeared USAXS/SAXS intensity profile, and corresponding component distributions for KDP subject to CSP at 50 °C with p = 125 MPa after (a,b) 4 min (early stage); (c,d) 49 min (late stage).

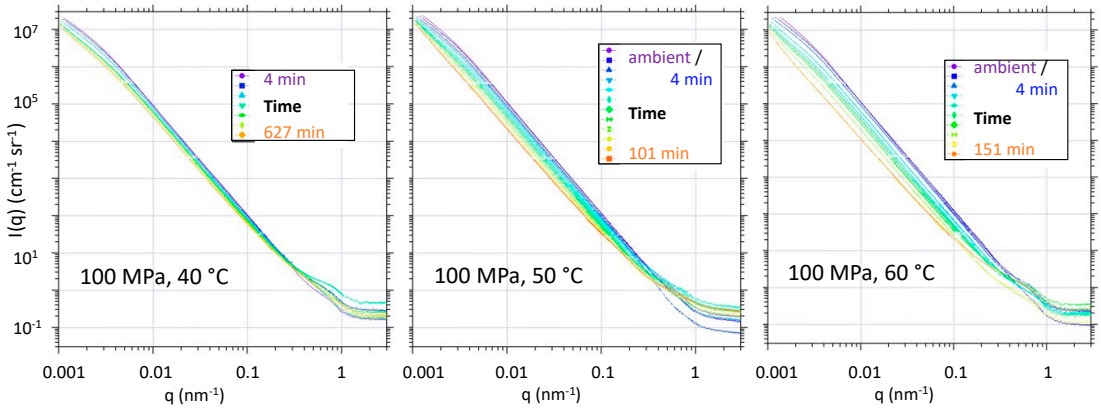


**Figure S3.** In situ slit-smeared USAXS/SAXS line-trace data for KDP subject to CSP with p = 100 MPa at 40 °C, 50 °C, and 60 °C. Point-to-point data uncertainties given by scatter in the line traces.

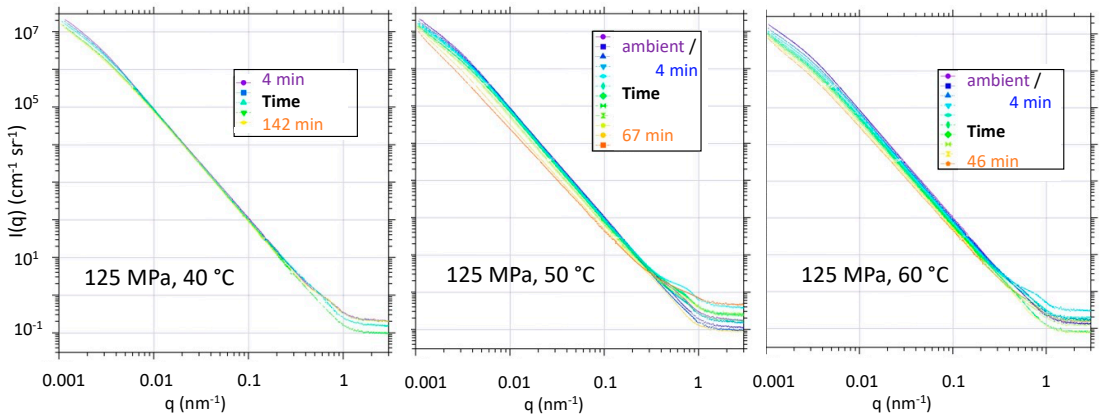


**Figure S4.** In situ slit-smeared USAXS/SAXS line-trace data for KDP subject to CSP with p = 125 MPa at 40 °C, 50 °C, and 60 °C. Point-to-point data uncertainties given by scatter in the line traces.

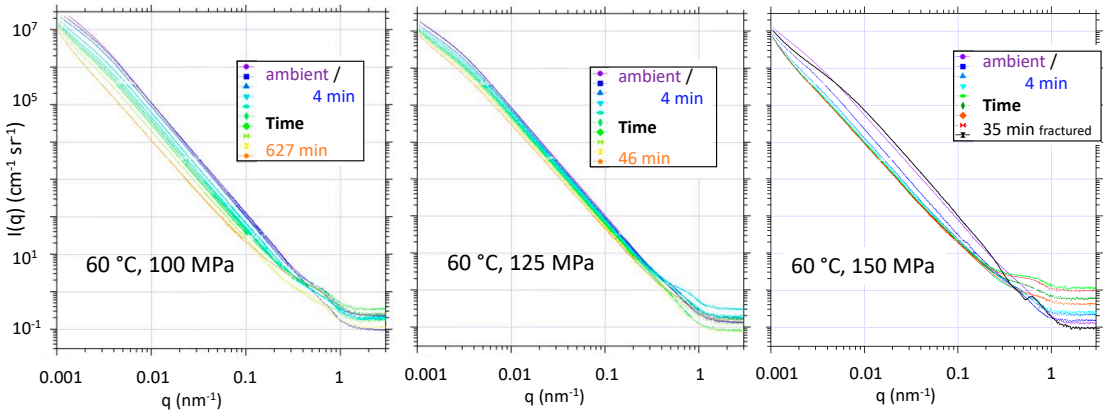


**Figure S5.** In situ slit-smeared USAXS/SAXS line-trace data for KDP subject to CSP at 60 °C with p = 100 MPa, 125 MPa, and 150 MPa. Point-to-point data uncertainties given by scatter in the line traces. Also shown for 150 MPa case (black trace) is a dataset observed after local fracture of the sample under stress, resulting in apparent debonding of locally sintered powder grains.