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Supporting information for article:

Assessing an aqueous flow cell designed for *in-situ* crystal growth under X-ray nanotomography and effects of radiolysis products

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Table S1 Materials used for the construction of the flow cell.

Materials	Brand
Peak tube	Cole-Parmer (1/32" ID)
Kinematic mount	MKS Newport, M-BK-1A-T
Peak tube adaptor	Cole-Parmer
Teflon tube	McMaster-Carr (1/32" ID)
Quartz glass capillary	Charles Supper Company, 100 μm diameter round quartz tube, 10 μm wall thickness
Kapton film	McMaster-Carr (127 μm thickness)

S1. Estimation of does rate from water

ρ = 0.012 water/Å^2 is the number of water molecules per unit area estimated from 0.033 water/Å^3 (number density of water) integrated over a thickness (d) of Ro-o, which is the liquid water O-O distance of 2.79 Å obtained from a typical neutron radial distribution function data (ref). h = 1.2 μm is the depth of the photoelectrons being generated based on the continuous-slowing-down approximation. $\sigma(water)$ = 7.43 cm^2/g (XCOM NIST database) is the photoelectron cross-section of water and S (water) = 24.48 MeV cm^2/g (ESTAR NIST database) is the stopping powder of water at 9 keV. Dose rate *J (water)* = 2.81 × 10^4 Gy/s.

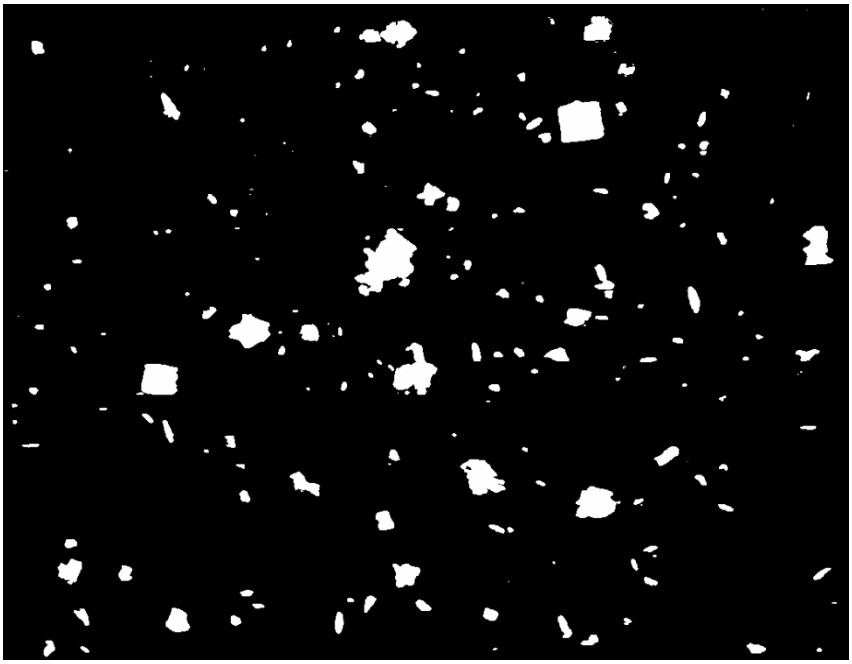

Figure S1 Estimation of surface area of barite illuminated by the X-ray beam. The binary image shown in Fig 2a was projected onto the quartz surface of an area of 827 μm^2, yielding a 4.16% of the total field of view covered by barite.

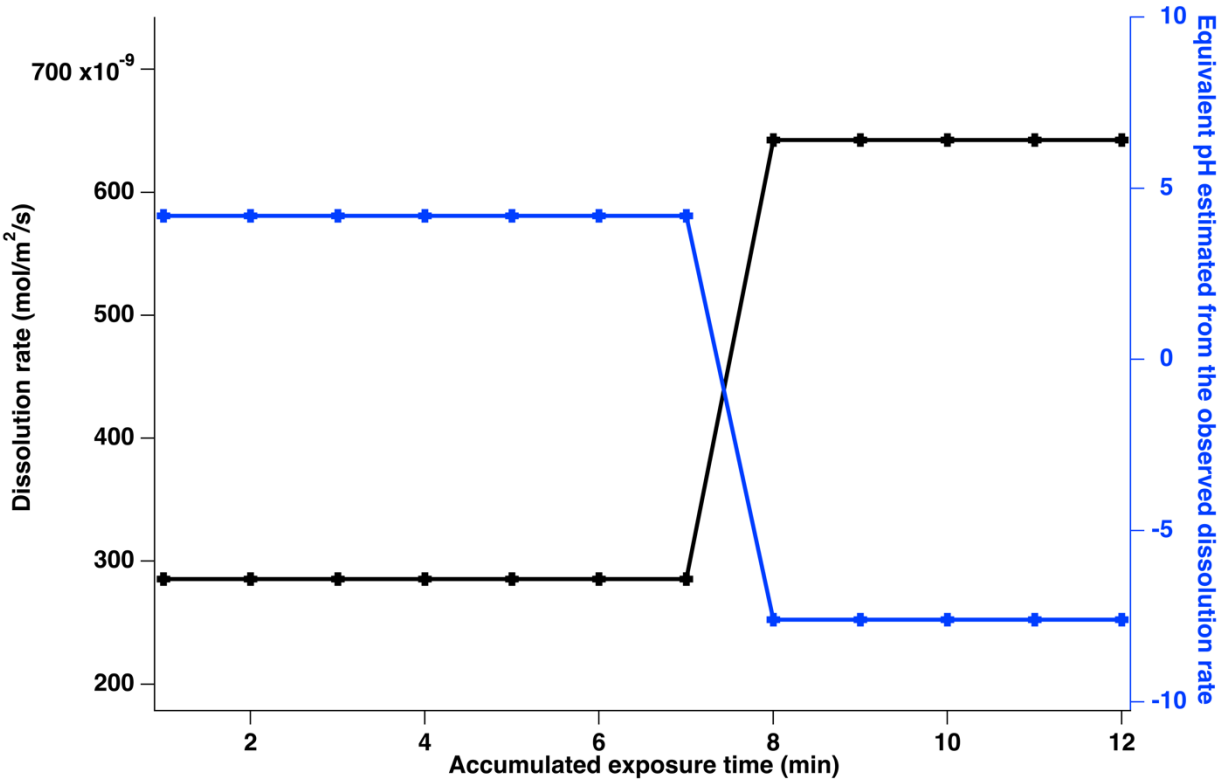

Figure S2 Dissolution rates and associated pHs as a function of the accumulated exposure time. pH values were calculated based on the observed dissolution rates according to ref [50]. The barite dissolution rate $r = k(\Omega^{0.2}-1)$, where r is the dissolution rate in mol/m^2/s, k is the rate constant, and Ω is the saturation state in $[Ba^{2+}][SO_4^{2}]/K_{sp,barite.}$ For simple estimation, we assume the solution saturation state close to the barite surface Ω = 0 in our experiments, therefore, the calculated dissolution rate r will equal to the rate constant k. Two different dissolution rates were estimated. Dissolution rate 1 was calculated based on data from 1 min to 8 min and the dissolution rate 2 was calculated based on data from 8 min to 12 min in Fig. 3a.