



## *Supplement of*

# **A new X-ray-transparent flow-through reaction cell for a $\mu$ -CT-based concomitant surveillance of the reaction progress of hydrothermal mineral–fluid interactions**

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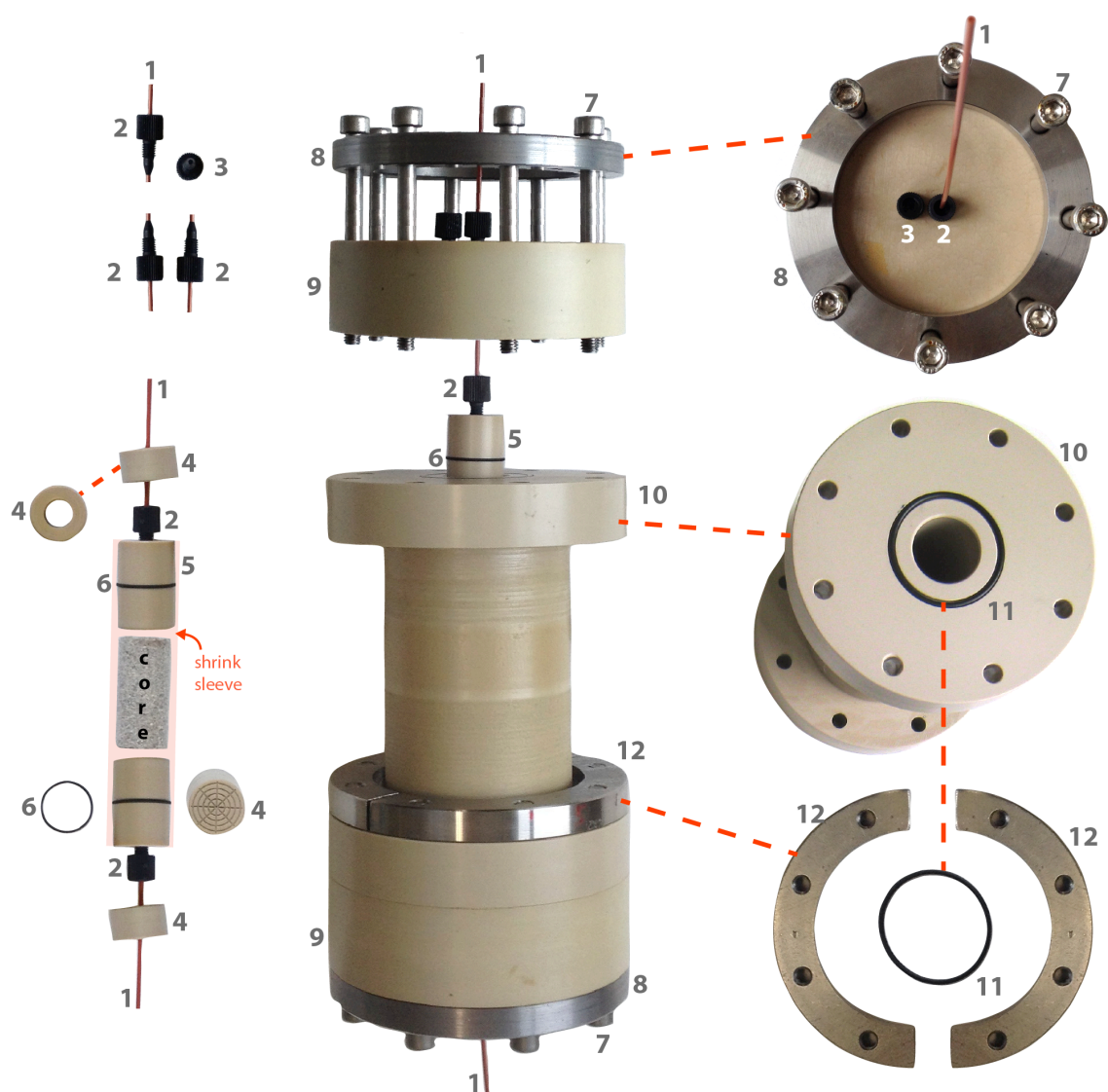
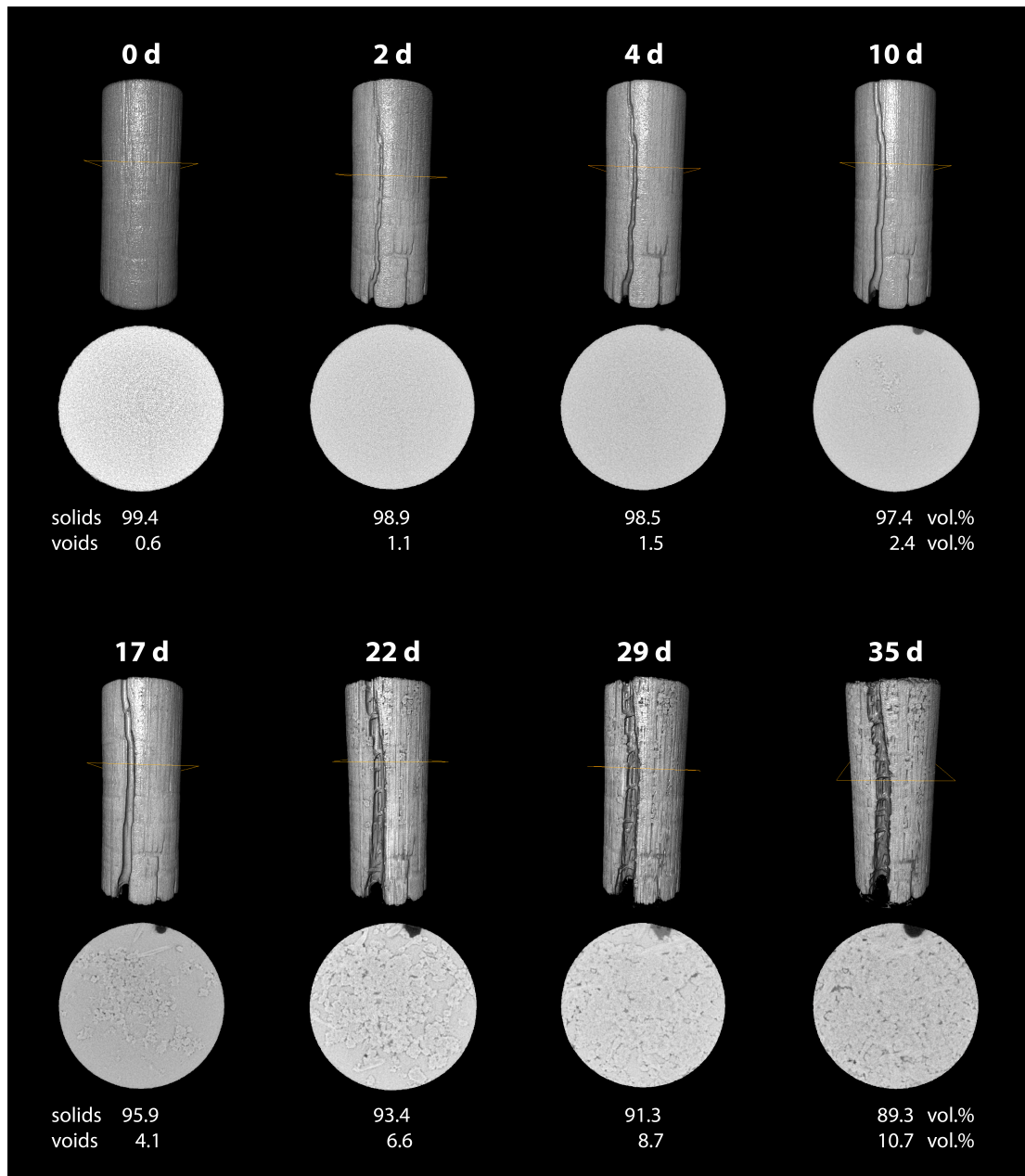


Figure S1. Collage of photographs featuring the components of the cell. The labels correspond to the positions in Tab. S1.



**Figure S2. Documentation of formation and evolution of flow paths in the course of gypsum dissolution and anhydrite growth by concomitant  $\mu$ -CT surveillance.** A series of eight  $\mu$ -CT scans were performed at several time steps (reaching from 0 to 35 days after the beginning of the experiment, as denoted in the figure). From the volume reconstructions the formation and broadening of a main cavity ("worm hole") is clearly visible (voxel size is 23.18  $\mu\text{m}$ ). The individual slices disclose the continued growth of anhydrite needles within the selenite. The nuclei of the newly formed anhydrite are located in association with fractures in the selenite (see state after 10 days). Note: the orange plane within the volume reconstruction marks the level of the single slice shown below.

**Table S1. Cell assembly and flow line components, parts list.**

Part No.	Component	Pieces per full cell setup	Comment (material; supplier; dimensions, etc.)
<i>Cell</i>			
1*	PEEK tubing 1/16"	3 connections	PEEK; Upchurch Scientific; 1.60 mm O.D., 0.5 mm I.D.; connections are: (1) flow line-core inlet, (2) core outlet - flow line, (3) to cell mantle pressure
2	finger-tight fitting	5 x	PEEK, Upchurch Scientific; 10-32 coned for 1/16" O.D. tubing
3	finger-tight column plug	1 x	PEEK, Upchurch Scientific; 10-32 coned, plug for bleeding cell mantle
4	spacer for fitting	2 x	PEEK; KTK Kunststofftechnik / workshop; O.D. 19 mm, I.D. 9.5 mm, h: 10 mm
5	Core end plug	2 x	PEEK; KTK Kunststofftechnik / workshop; r: 19 mm; h: 40 mm, corewards: spiderweb groove pattern, connection to flow line: 10-32 coned
6	O-ring	2 x	Viton; Trelleborg; 17.00 mm x 1.00 mm
7	M6 screws	16 x	steel, M6 x 70, to be screwed hand-tight
8	cell fixation, metal ring	2 x	steel; workshop; R: 100 mm, r: 70 mm, thickness: 10 mm, each ring has 8 holes at 8/360°, corresponding to #9, #10, #12
9	cell, end caps	2 x	PEEK; KTK Kunststofftechnik / workshop; h: 30 mm, 100 mm O.D., each cap has 8 holes at 8/360°, corresponding to #8, #10, #12
10	cell, central part	1 x	PEEK; KTK Kunststofftechnik / workshop; h: 130 mm, 100 mm O.D., 22 mm I.D., each dumbbell end has 8 holes at 8/360°, corresponding to #10, #12
11	O-ring	2 x	Viton; Trelleborg; 34.65 mm x 1.78 mm
12	cell fixation, metal half rings	4 x	steel; workshop; D: 100 mm, d: 70 mm, thickness: 10 mm, each half ring has 4 holes at 8/360°, corresponding to #8, #9, #10
	shrink sleeve	1 x	fluoroethylenepropylene; Adtech Polymer Engineering ltd.
<i>Flow line</i>			
	stream split HP titanium		PEEK and titanium in contact with fluid; Upchurch Scientific; stream split high-pressure used as valve and bleed
	tee connector		PEEK; Upchurch Scientific; connect and bleed
	in-line filter		PEEK; Upchurch Scientific; filter 2 µm
	pressure multiplier		steel; SITEC; custom-made (optional use): free-moving piston of dissymmetric diameter
	backpressure regulator		VICI, JR-BPR-2, range 20-103 bar

\*Part numbers refer to Fig. S1.