

Three-dimensional-Printed Polymeric Cores for Methane Hydrate Enhanced Growth

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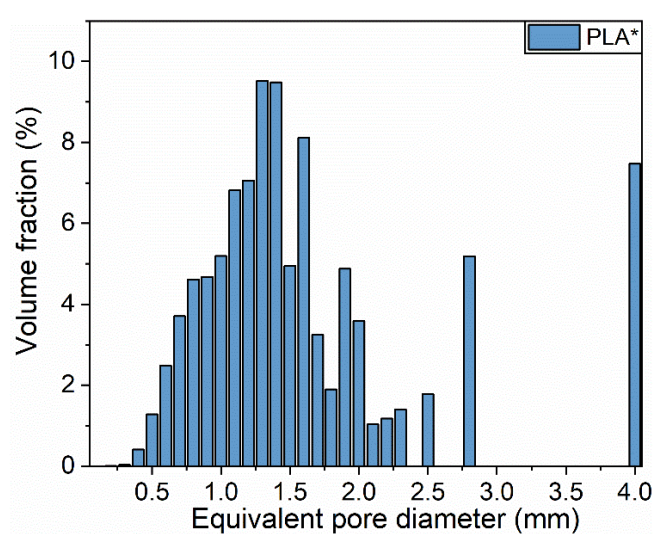
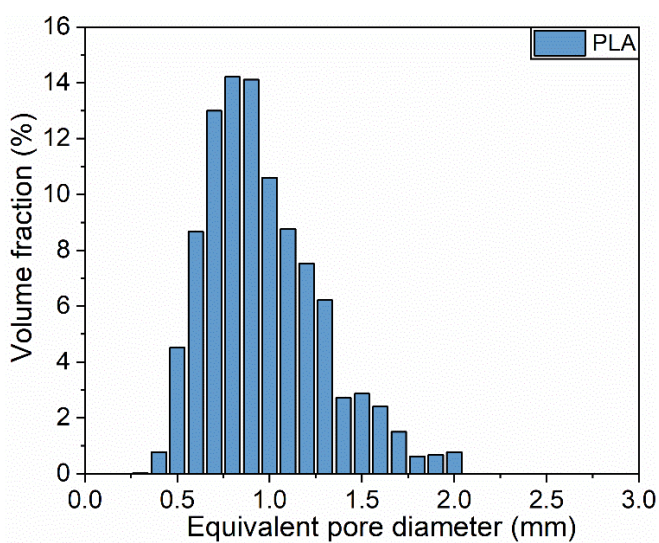
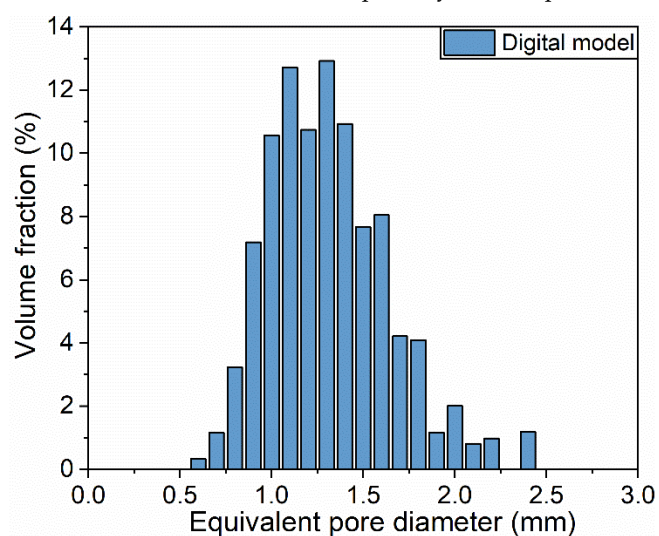
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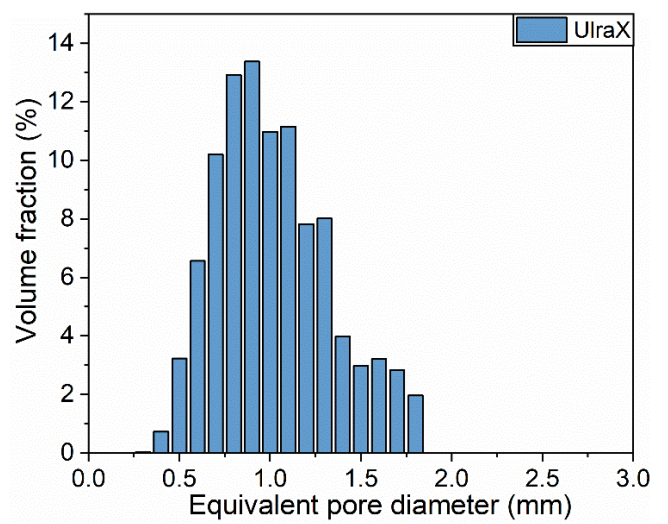
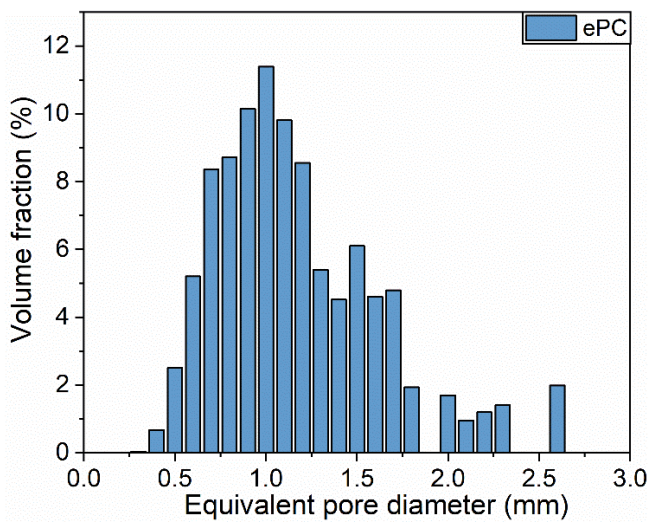
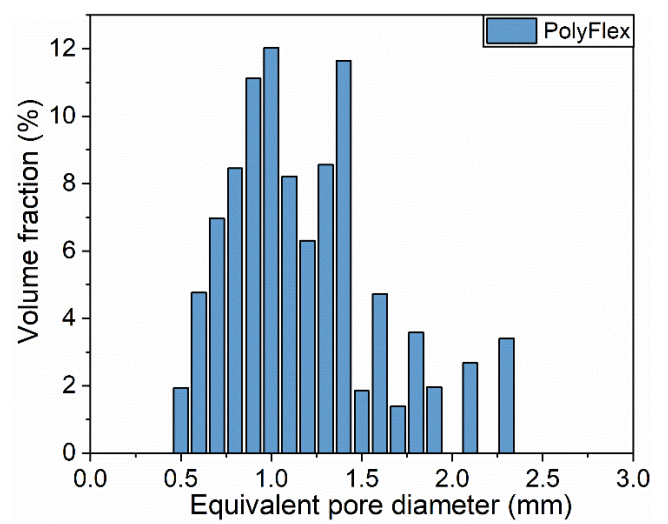
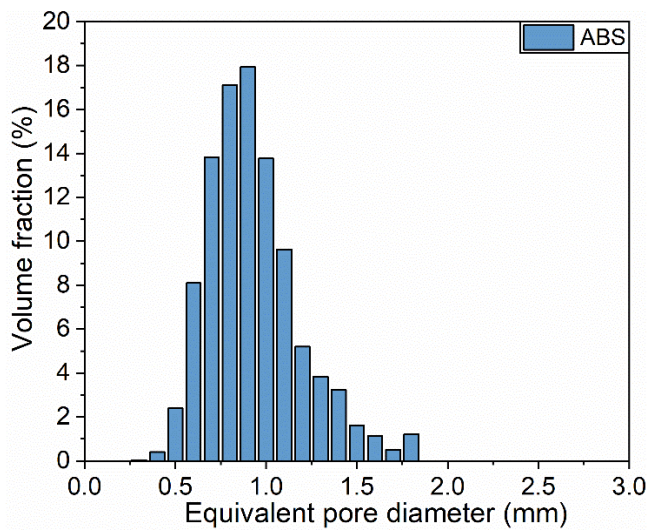
Effective porosity data

Pore diameters distribution

Volume fraction of pores with a certain equivalent diameter was calculated based on the total volume of effective porosity.

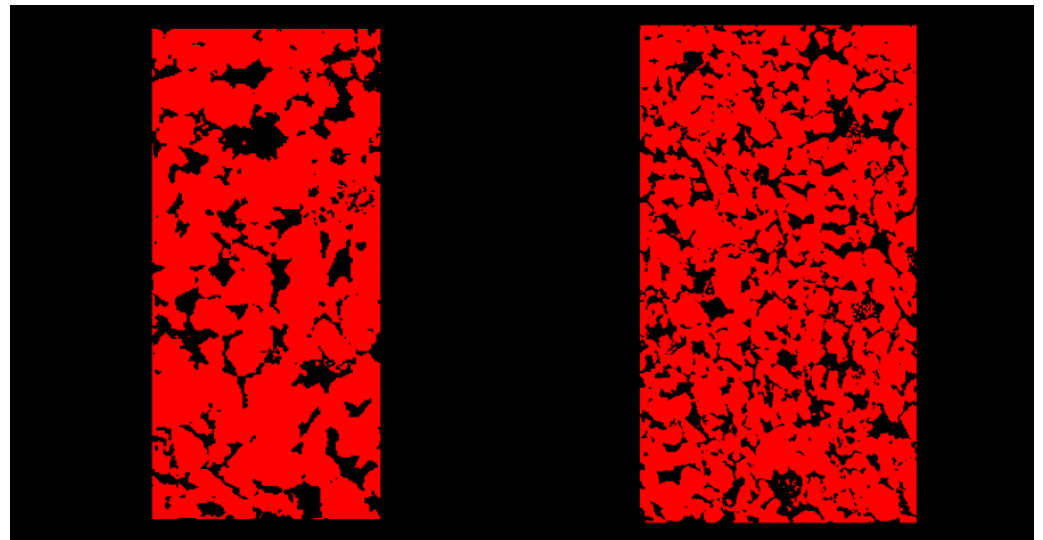
Figure S1. Pore diameters distribution depending on their volumes relative to the volume of effective porosity; the samples names are specified on the graphs.





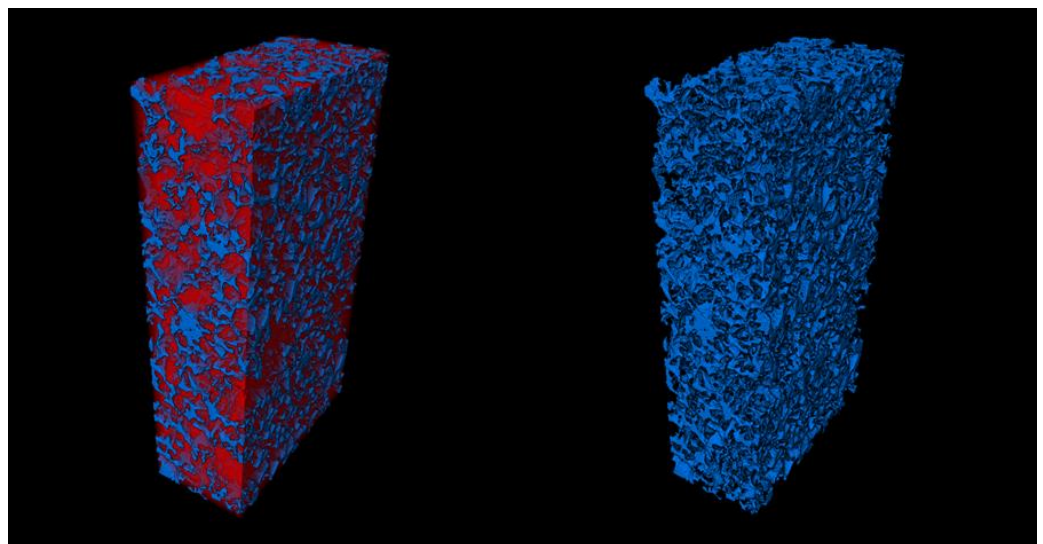
The structure of 3D-printed samples

Digital model (for 200 μm extrusion width)



XZ

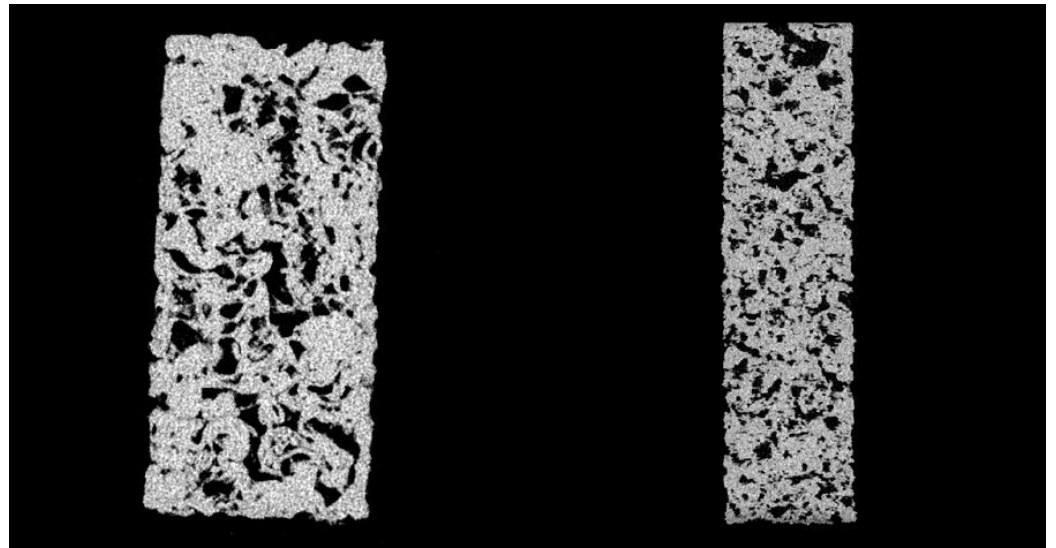
YZ



3D visualization of the sample

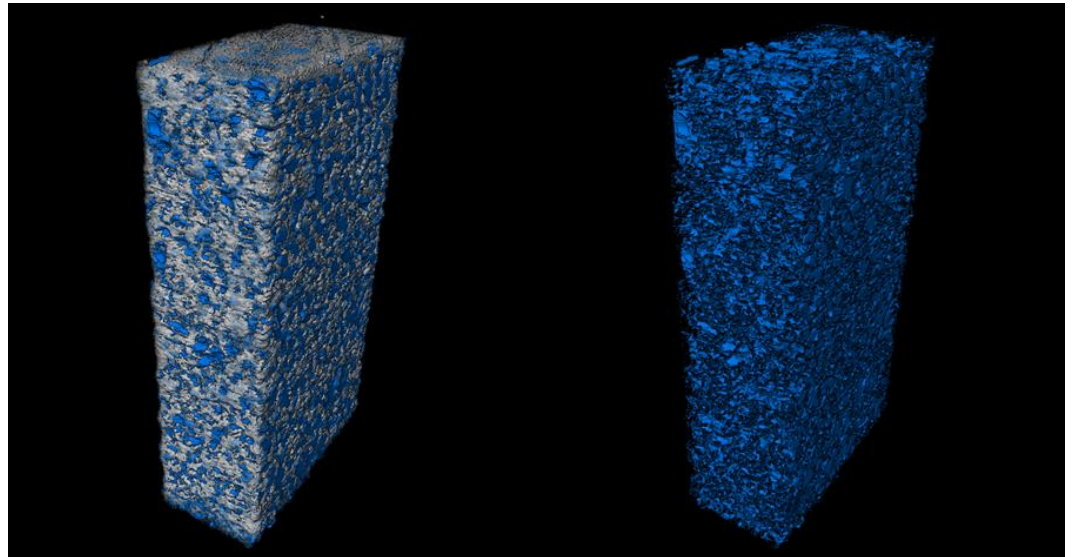
3D visualization of void space

PLA



XZ

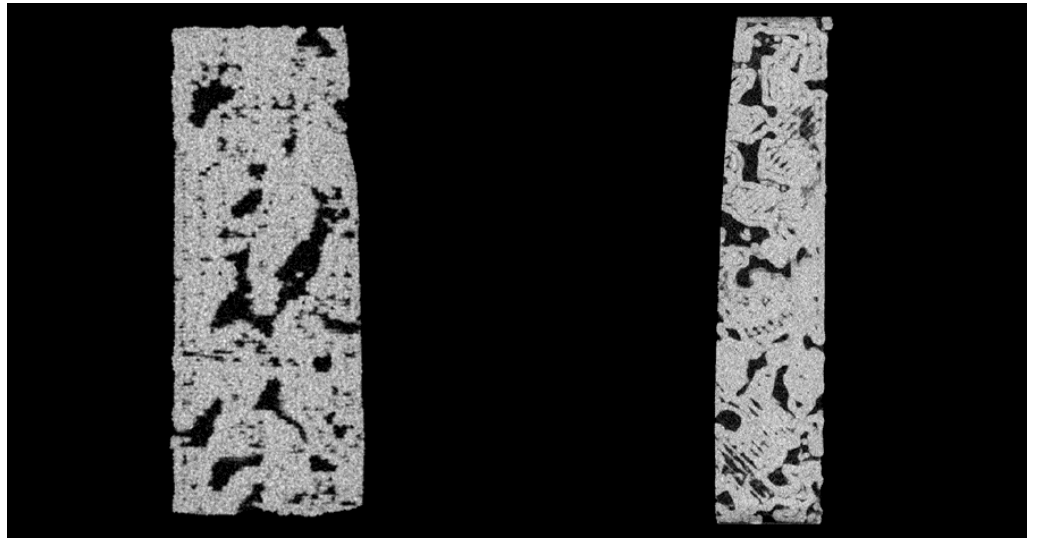
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3D visualization of the sample

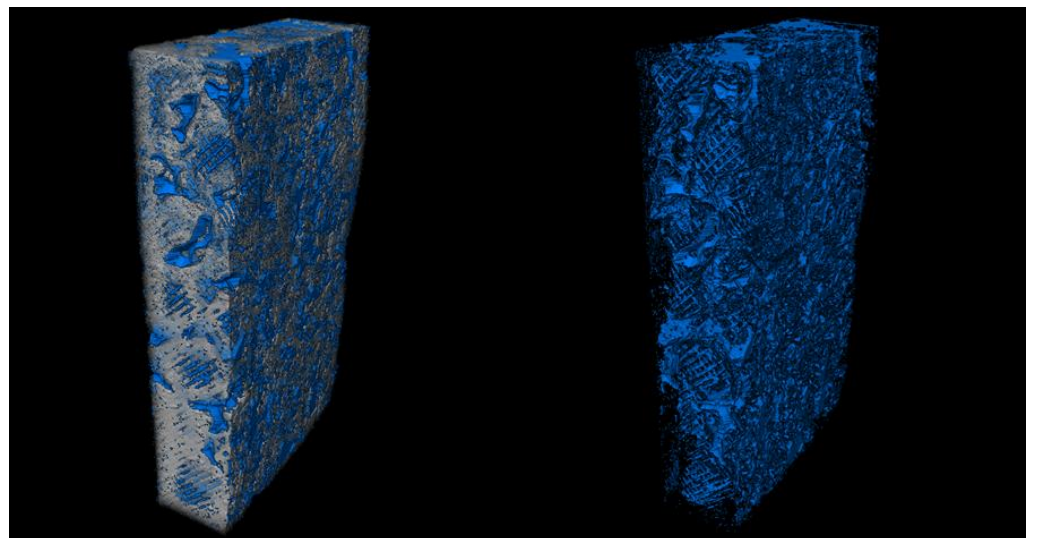
3D visualization of void space

PLA*



XZ

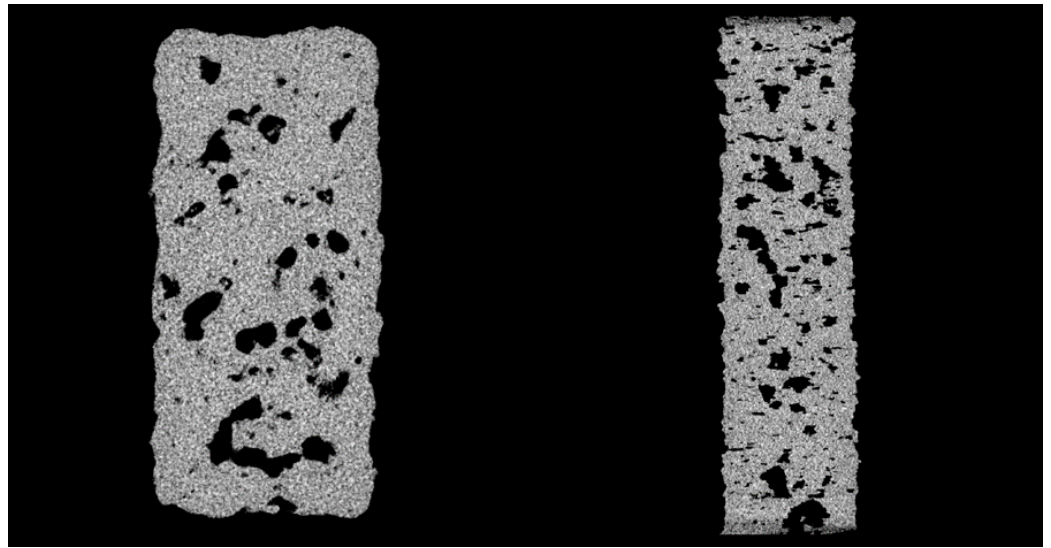
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3D visualization of the sample

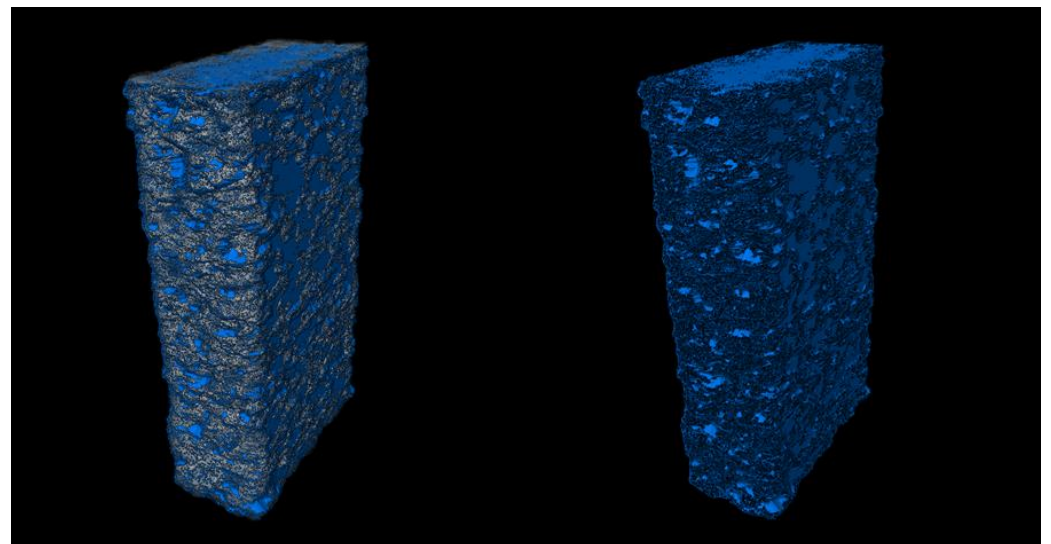
3D visualization of void space

PolyFlex



XZ

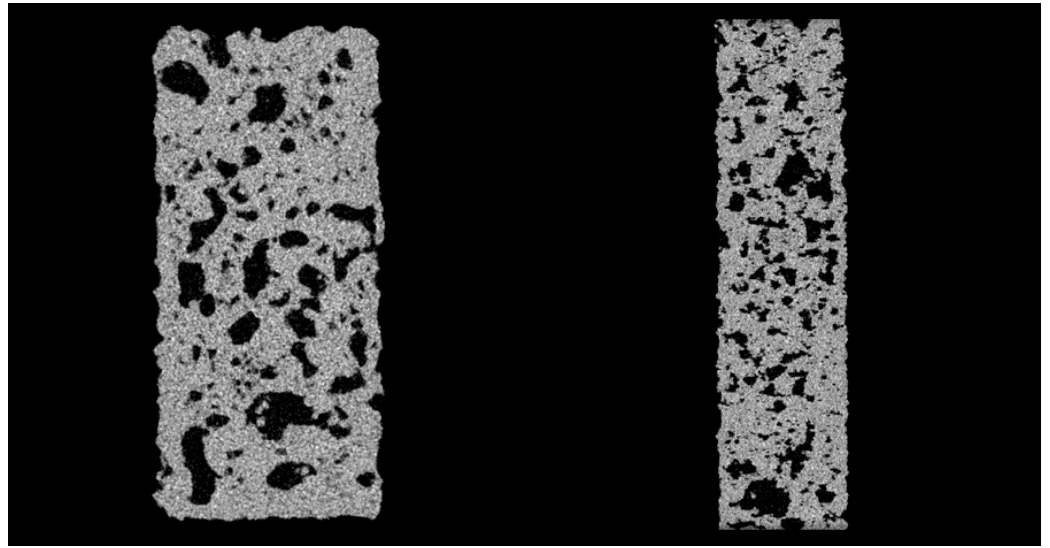
YZ



3D visualization of the sample

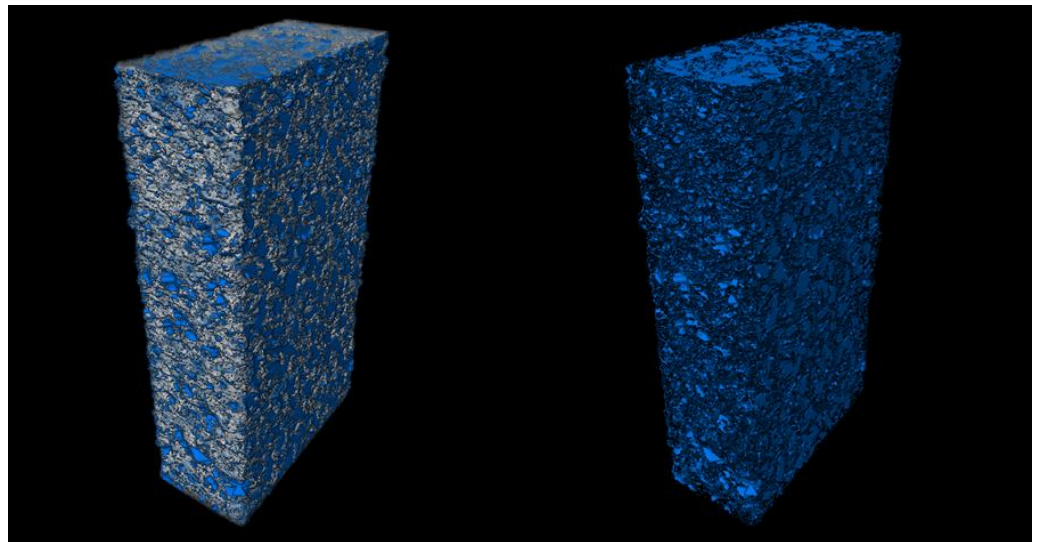
3D visualization of void space

UltraX



XZ

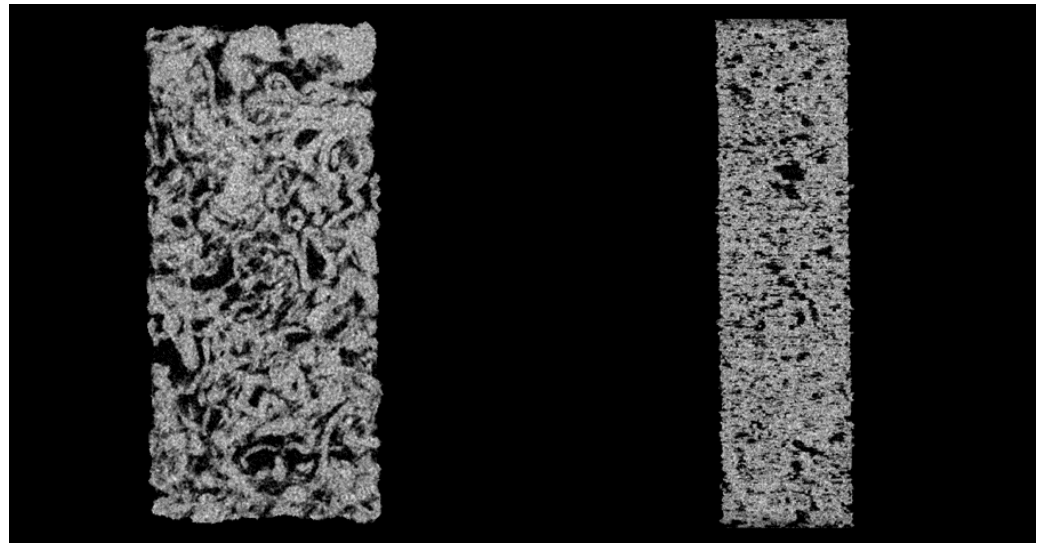
YZ



3D visualization of the sample

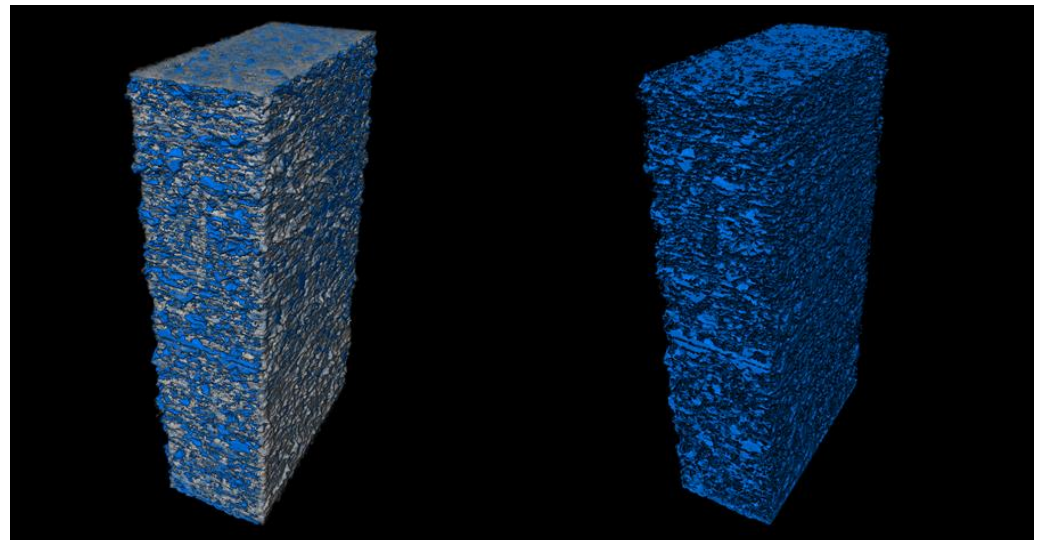
3D visualization of void space

ABS



XZ

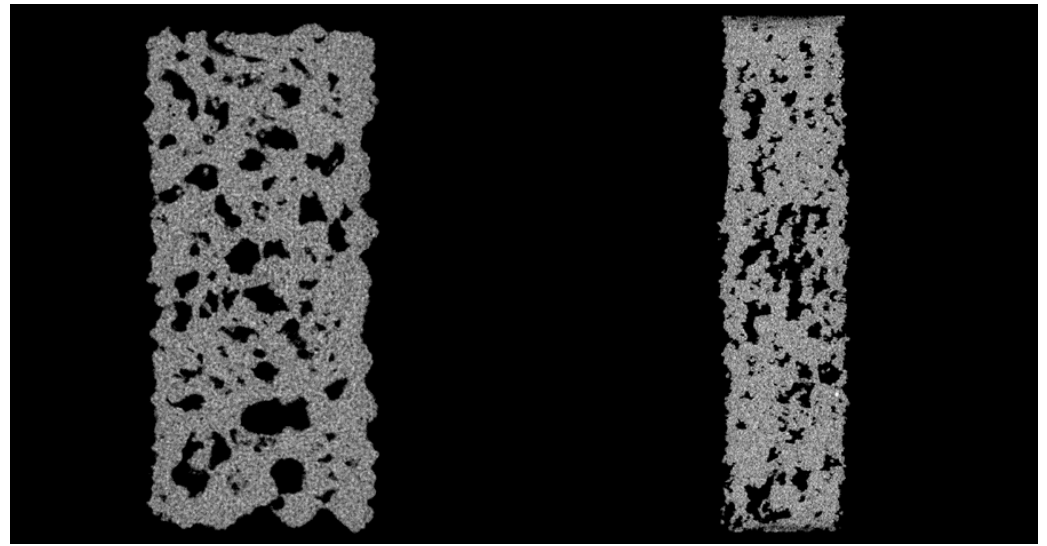
YZ



3D visualization of the sample

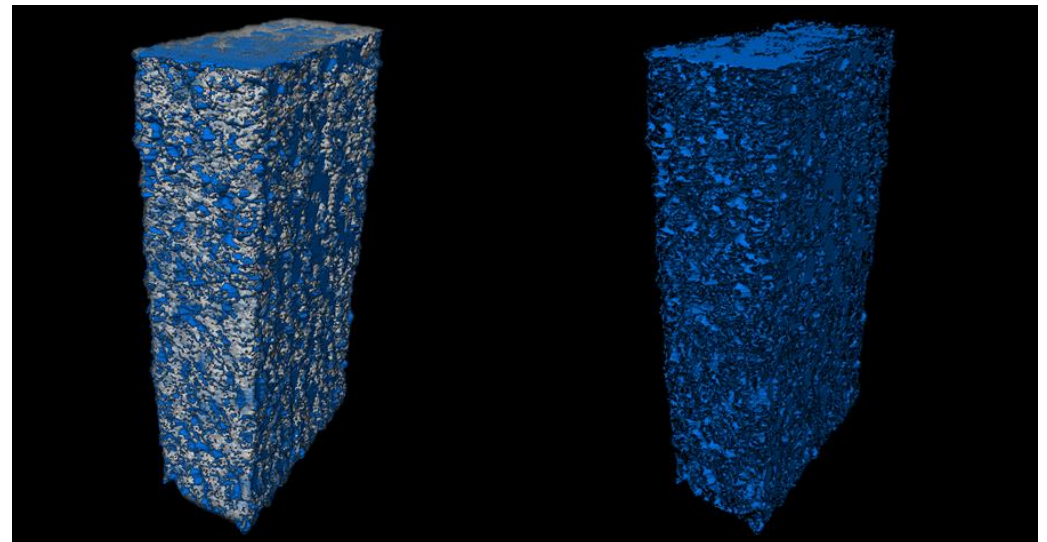
3D visualization of void space

ePC



XZ

YZ



3D visualization of the sample

3D visualization of void space

Figure S2. XZ and YZ orthogonal tomographic sections of the studied samples, their 3D visualization, and the void space; the rectangular parallelepiped dimensions are 27x15x7 mm.

Hydrate morphology

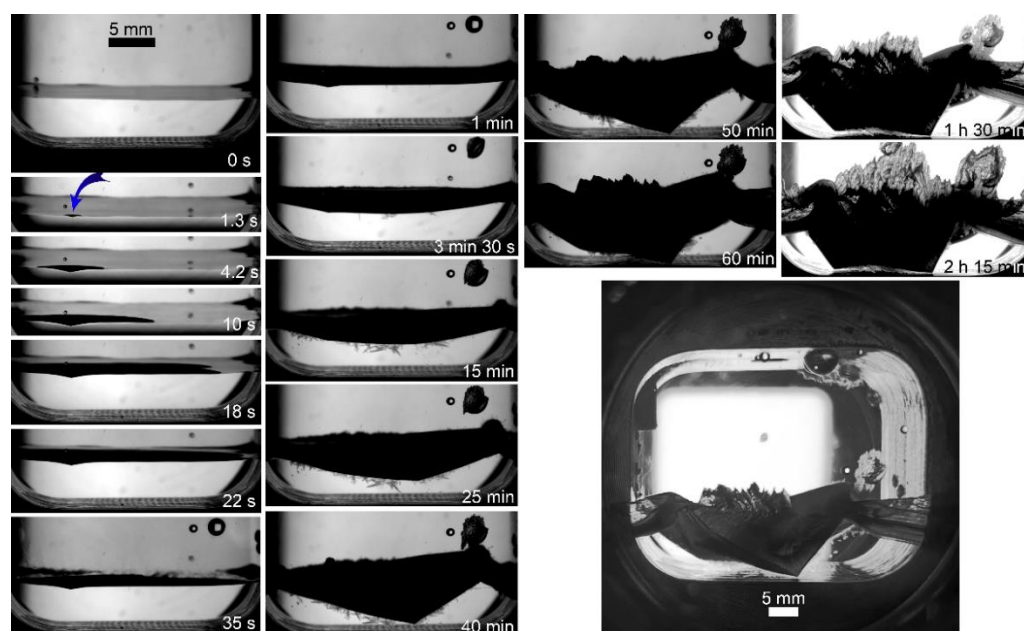


Figure S3. Methane hydrate formation from 5 ml of deionized water without an insertion; blue arrow indicates the hydrate onset site; the lower right photo shows the system's appearance after 12 h since the hydrate onset.

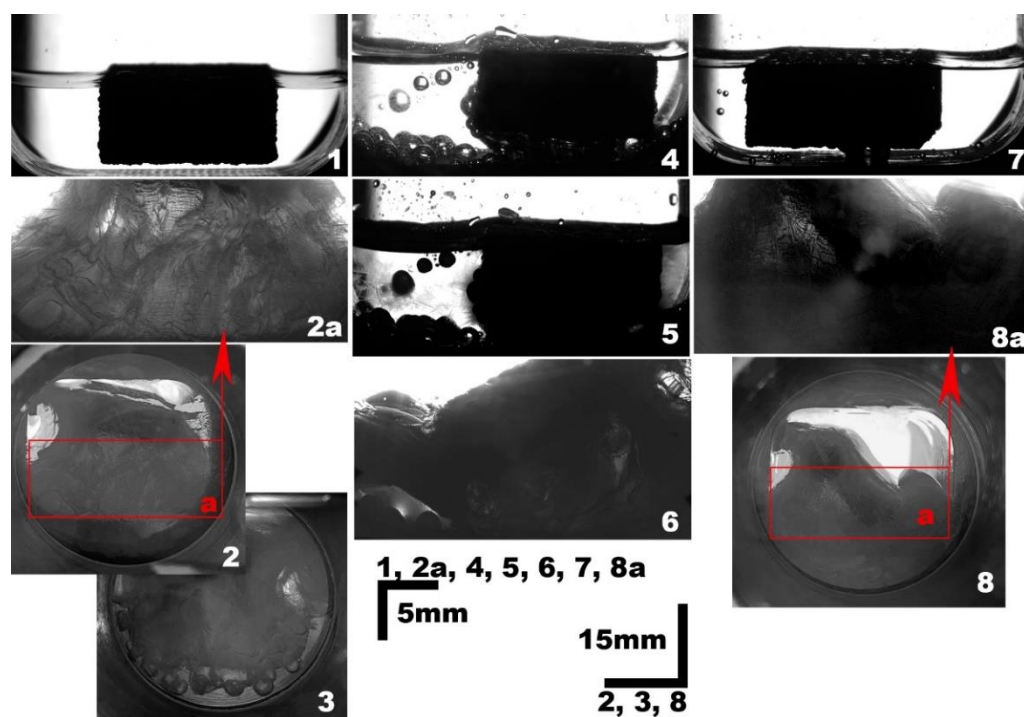


Figure S4. Methane hydrate formation from 5 ml of deionized water with ABS insertion; 1-3 – 1st hydrate formation, 4-6 – re-obtaining the hydrate (for 40 min) after hydrate dissociation near equilibrium conditions (at 14-15°C); 7-8 – re-obtaining the hydrate after complete hydrate dissociation at 35° for 2 h; picture 5 shows hydrate crystals blown into the water volume.

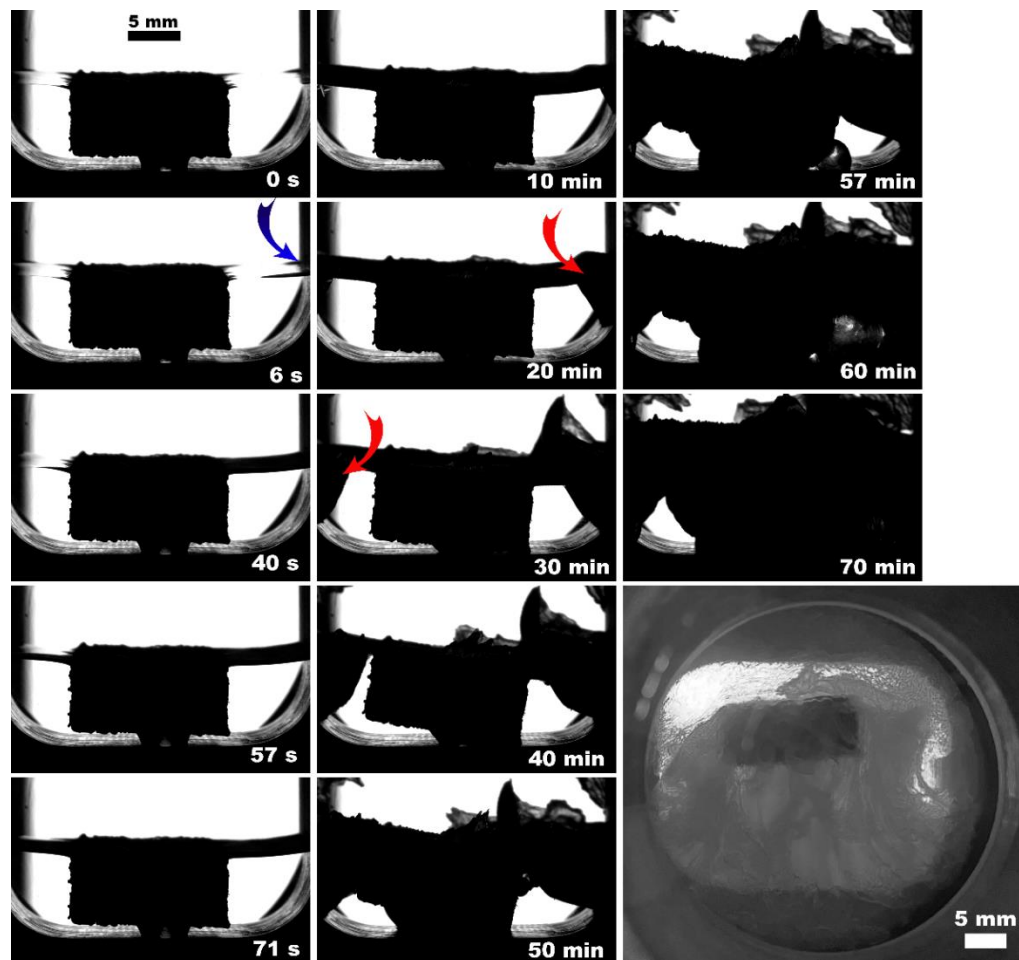


Figure S5. Methane hydrate formation from 5 ml of deionized water with ePC insertion; blue arrow indicates the hydrate onset; the red ones show hydrate arrays growing from cell walls; the lower right photo shows the system's appearance after 12 h since the hydrate onset.