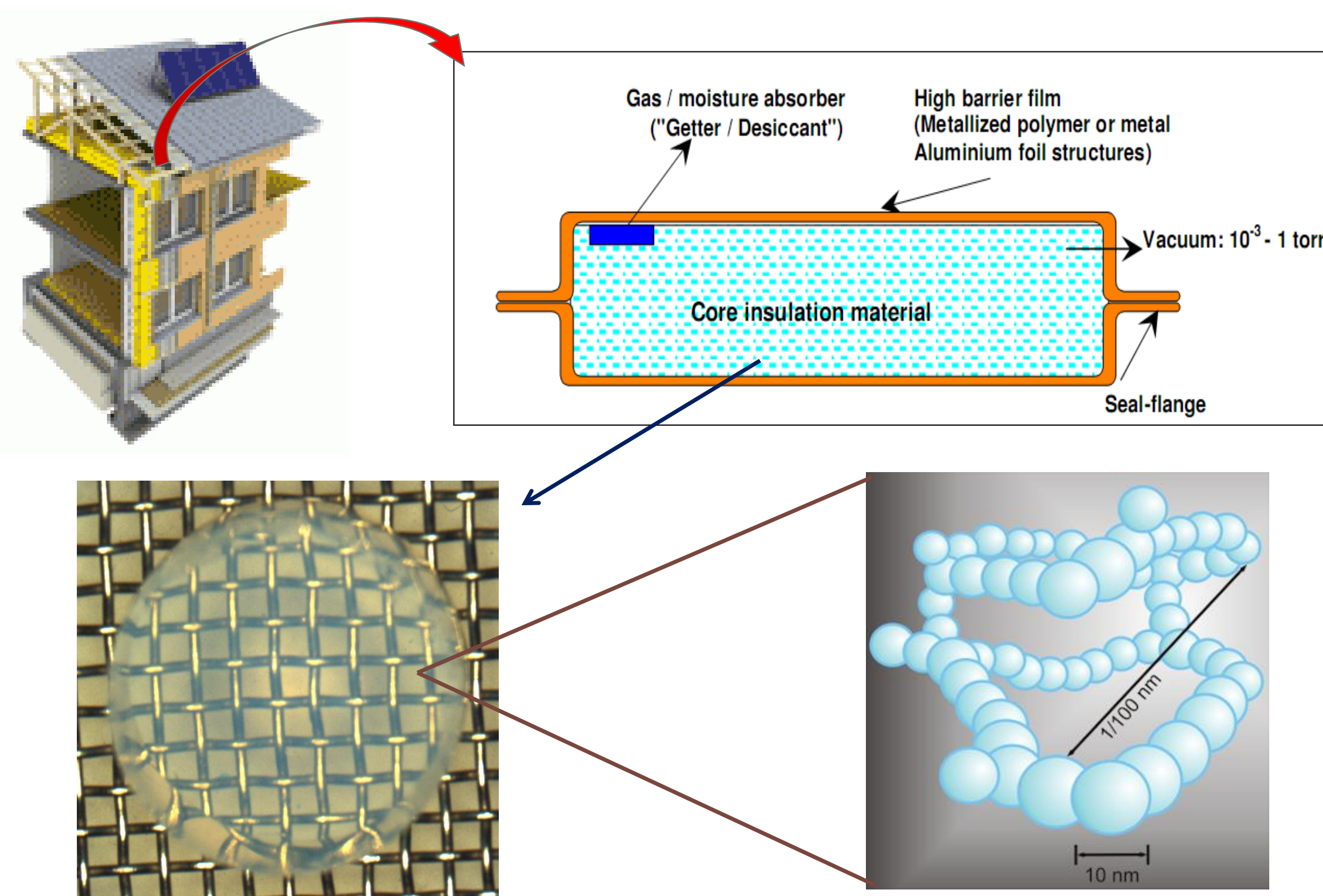


BACKGROUND



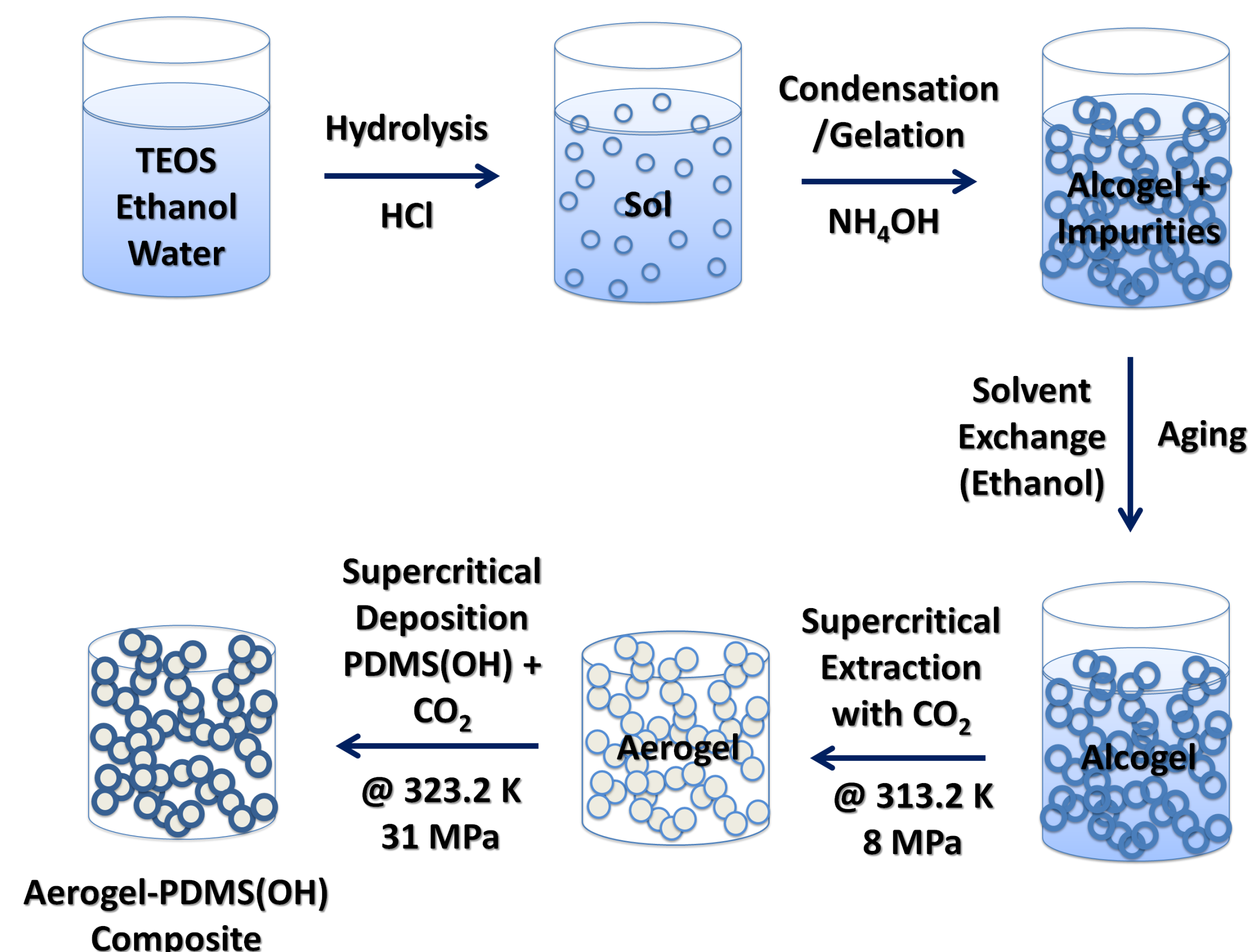
Silica Aerogels: potential candidates as filler materials in transparent VIPs

- Very low thermal conductivity
- Transparency
- Monolithic

OBJECTIVE

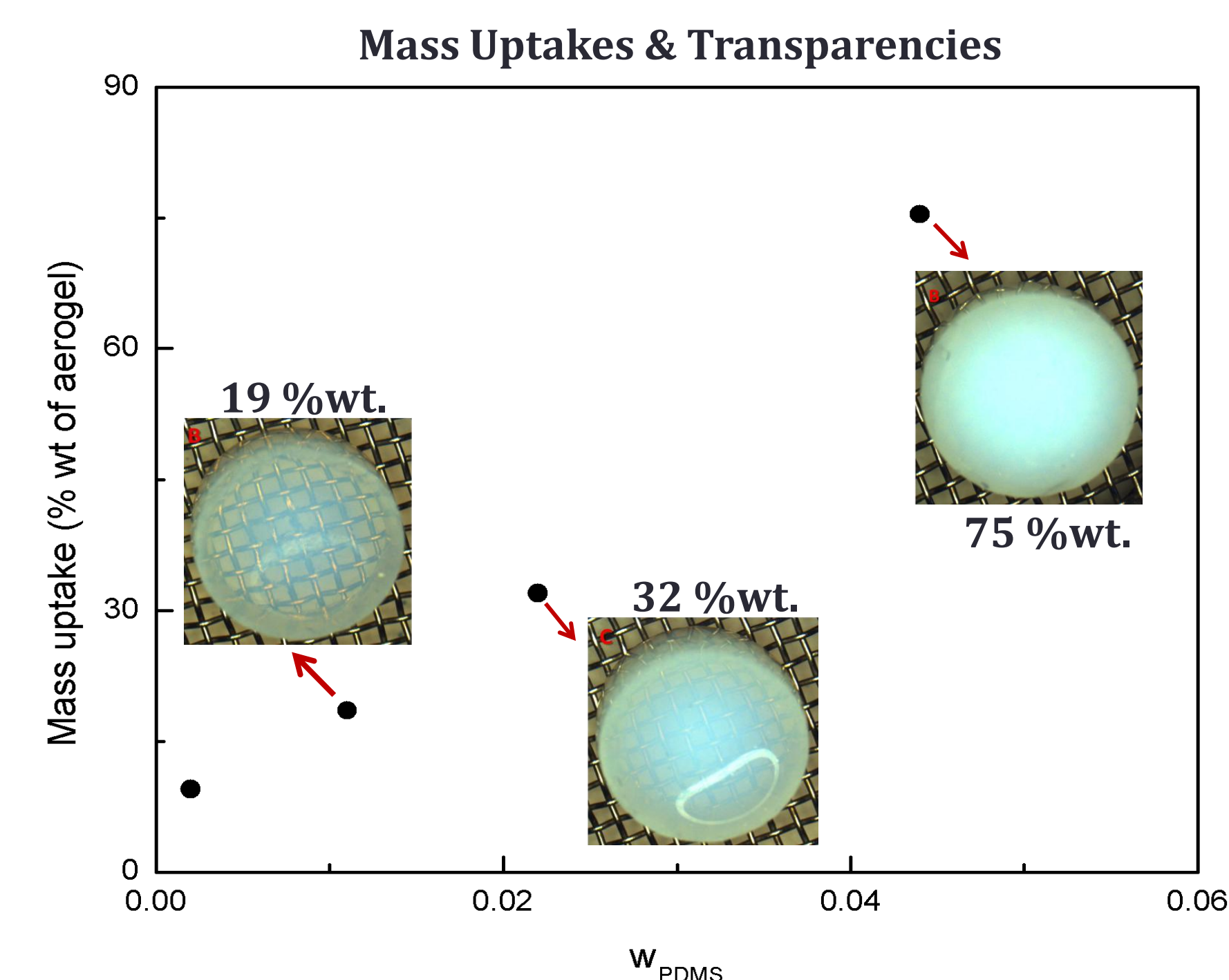
To develop monolithic, transparent & opaque, resilient composites of silica aerogels with hydroxy-terminated poly(dimethylsiloxane) (PDMS(OH)) to be used as core materials in vacuum insulation panels (VIPs).

PROCEDURE



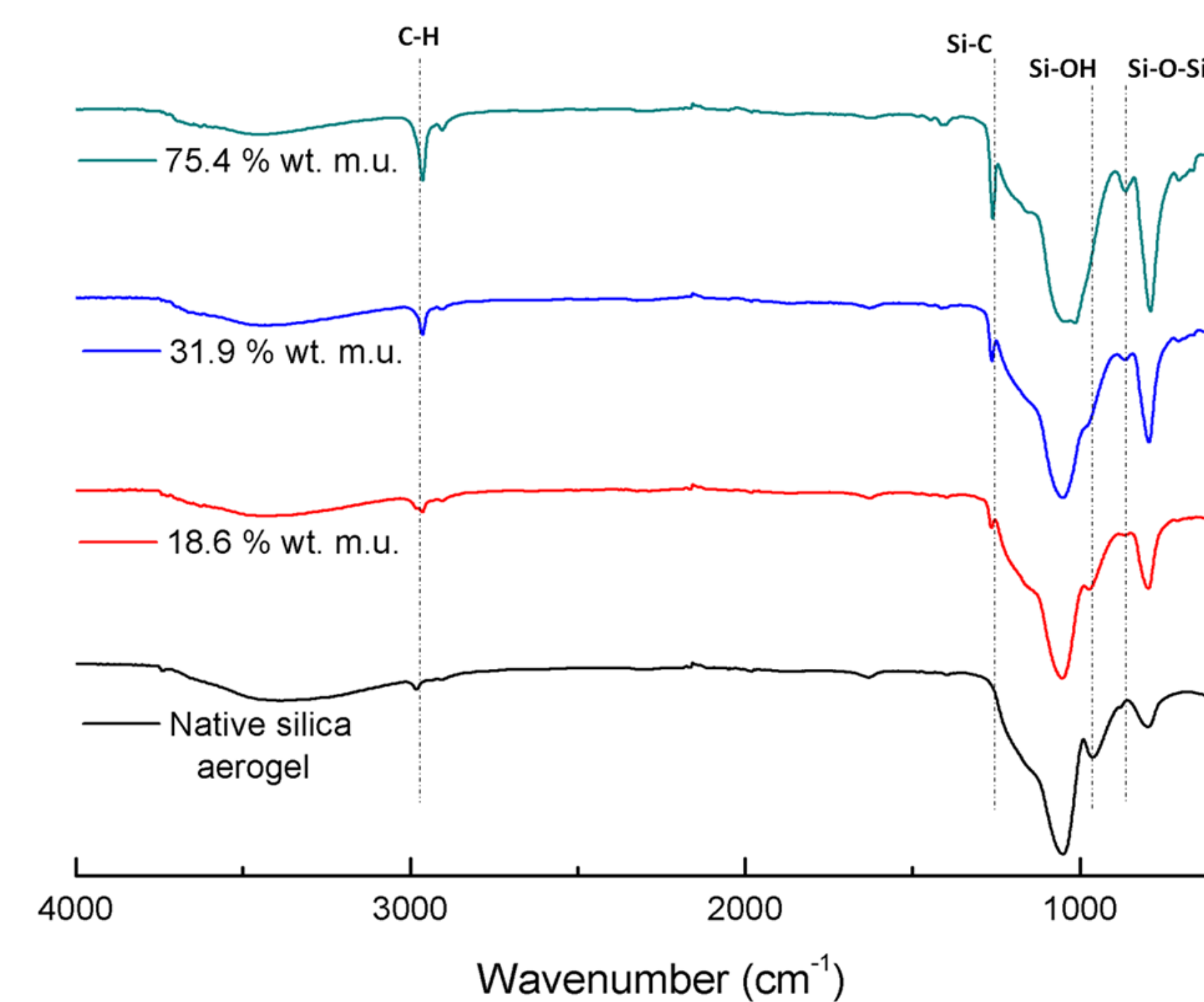
RESULTS

Composites with different polymer contents



Polymer content can be controlled with PDMS(OH) concentration during supercritical deposition

Chemical attachment of PDMS(OH) on aerogel surface

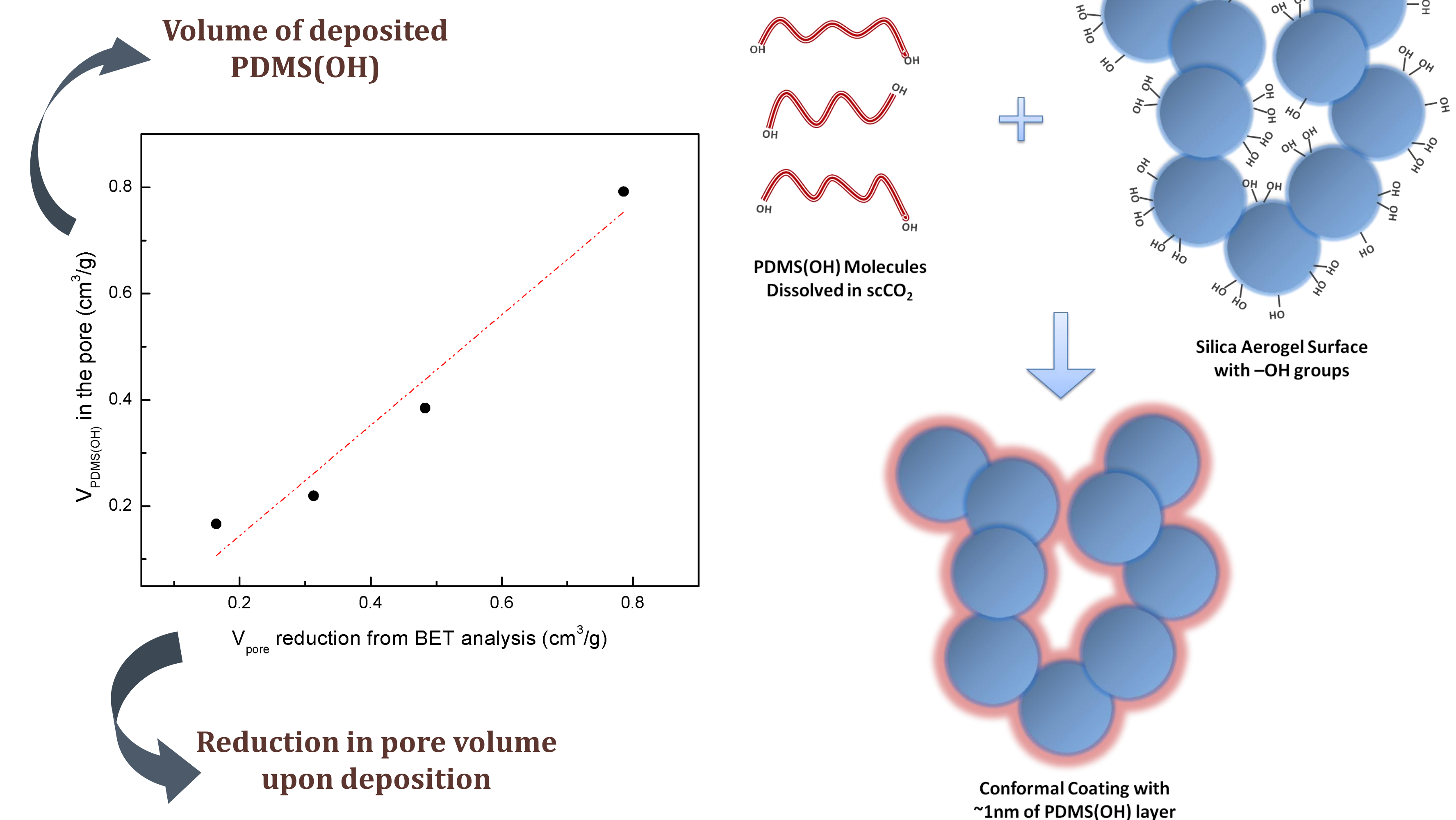


Evolution of Si-OH peak confirms the chemical reaction between PDMS(OH) and surface -OH groups of silica aerogel

CONCLUSIONS

- Monolithic composites of silica aerogel with PDMS(OH) were obtained by a reactive supercritical deposition technique.
- It was demonstrated that polymer uptakes as high as 75.4 %wt. can be obtained by supercritical deposition technique.
- The chemical reaction between PDMS(OH) with the surface -OH groups of the silica aerogel was revealed with ATR-FTIR analysis.
- The volume of loaded polymer corresponded to pore volume reduction from BET analysis which demonstrated that the polymer molecules formed a conformal coating on the silica aerogel surface.
- The thermal conductivity of the PDMS(OH)-silica aerogel composite was measured to be close to native silica aerogel.

Conformal coating of the silica aerogel surface with PDMS(OH) layer



Thermal conductivities close to native silica aerogel

6.5x6.5x1 cm square aerogel samples

	Density (g/cm³)	Measured effective thermal conductivity (mW/m·K)
Native Silica Aerogel (A)	0.18	21.4
PDMS(OH)-Silica Aerogel Composite (B)	0.20	21.9

ACKNOWLEDGMENT

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