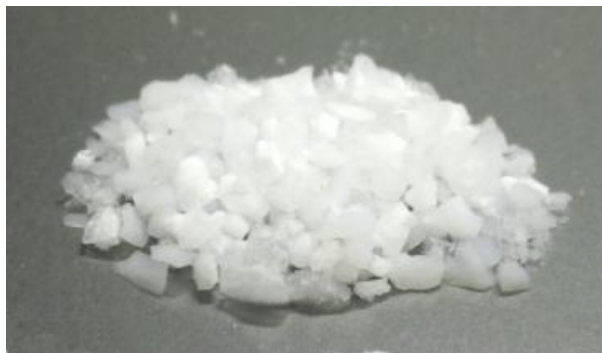


## NANORENDER - Performance of Silica Nanoaerogel-based Renders (PTDC/ECM/118262/2010, 2012-2015)



Partners: IST (CERIS and CFQM research units)

CERIS Principal Investigator: I. Flores-Colen (35%)

CERIS Research Team: J. de Brito; M. G. Gomes; A. M. Rodrigues; J. D. Silvestre; A. N. Sousa; A. Soares

Other research team members: L. Ilharco; M. Júlio; J. G. Martinho; J. P. Farinha

Funding: FCT

Total budget: 131.532€ CERIS: 131.532€

Period: 2012-2015

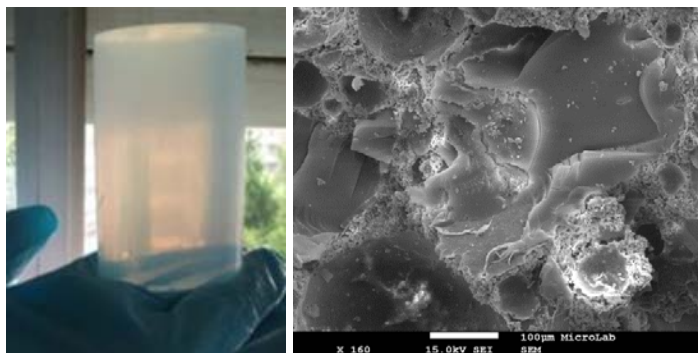
<http://www.florescolen.com/nanorender.html>

**Summary description:** this project investigated the use of silica-based aerogels in coating mortars (renders) in order to formulate improved-performance renders from a thermal, acoustic and environmental point of view, for application in building walls. The goal was to use as aggregate in mortars a silica or silica/latex-based aerogel, obtained from safer and less costly processes, already tested and patented by members of the CFQM research team.

**CERIS participation:** the composition and size grading of the aerogels used was optimized and various aerogel-based mortar mixes were studied, with various changing parameters such as the aggregates content, the silica-based aerogel type and content, the water/binder ratio, and the admixtures and additions content, in order to analyze the performance properties in mortar specimens. A detailed characterization of the aerogels' and renders' structure, density and porosity allowed understanding the essential role of the aggregate nature (inorganic or hybrid), content, and hydrophilic/lipophilic ratio on the final renders' performance. To evaluate the behaviour of renders various characterization tests of the performance of mortars applied in brick models and later on in prototype wall panels were carried out, using different values of the mortar's thickness.

**Output:** a theoretical simulation to predict the performance of renders applied on building walls, with different backgrounds and in in-service conditions, in order to characterize and quantify the economic, environmental, thermal and acoustic benefits that aerogel-based renders can bring to the construction industry vis-à-vis conventional renders.

### Illustrations:



On the left: Silica aerogel monolith; on the right: practical training model of a wall with different types of ETICS applied.

**Indicators:** one national patent (PT 108864 B); one website; one chapter in a book; 22 papers in international journals; three papers in national journals; 11 papers in international conferences; 6 papers in national conferences; one organization of a seminar; two invited keynotes in a workshop; one finished PhD thesis; one ongoing PhD thesis; 12 MSc dissertations; 30 research reports.

**NANORENDER - Performance of Silica Nanoaerogel-based Renders (PTDC/ECM/118262/2010, 2012-2015)**

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