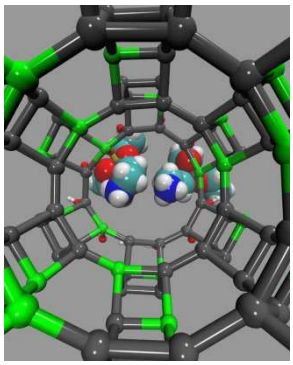
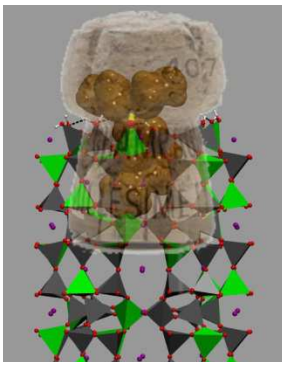
Gloria Tabacchi, Ettore Fois, Gion Calzaferri



Preventing molecules to escape



Structure of Nanochannel Entrances in Stopcock-Functionalized Zeolite L Composites

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What's it about?

The photostability of dyes is considerably improved by inserting them into the channels of inorganic porous materials such as zeolites. Plugging the channel entrances, so that the dye molecules cannot escape into the environment, is crucial for the long-term stability of these important composites.

Here we explain how zeolite channel entrances may be sealed by molecular stoppers.

Why is it important?

- How does the entrance of a nanometric pore appear to an incoming molecule?
- This information would be of key relevance for the fabrication and functionalization of electro-optical materials for solar energy applications, because these materials can be realized by loading dye molecules inside the pores of zeolites.
- For the first time, our study provides a *molecular-level view* of the pore entrances, which could facilitate the rational design of these useful materials.

Perspectives

- We've seen that different types of stopper molecules may either block or leave partially accessible the entrances of a porous host material.
- Specifically, the extent of pore occlusion depends on the size, shape, and chemical nature of the stopper.
- This knowledge would be instrumental in obtaining the desired chemical modification of zeolite-pores in advanced materials.
- As dye-zeolite hybrids are important building blocks for artificial antenna systems, our results could foster further development of these fascinating devices.