

## AEROGELS: MAGNETISM, SUSTAINED RELEASE, 3D-PRINTING

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### **ABSTRACT:**

I review recent activity in our laboratories in the field of sol-gel derived aerogel materials. Topics to be described include:

\* Magnetite aerogel – the first pure magnetic aerogel. A holy-grail of the aerogels field has been the synthesis of an aerogel made totally out of a magnetic oxide, particularly magnetite. I will describe the challenges in preparing this unique material, the solution to these challenges, and the special properties of the resulting magnetic material [1].

\* A method for the gradual hydrophobization of silica aerogel from the gas phase to the desired degree, was developed. Tailoring these continuous changes in the hydrophobicity was utilized to translate it into the control and tailoring of the degree sustained release of drugs from hydrophobic silica aerogels [2].

\* For potential applications of aerogels in various devices, methods for preparing these materials in various complex shapes, are needed. Towards that goal, several photoinduced methodologies for 3D printing of complex shape silica aerogels - from the microns to the millimeter scales – were developed [3], including the first 3D printed chiral silica aerogel for separation and purification of the enantiomers of chiral drugs.

### **References**

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[3]. Efrat Shukrun Farrell, Nir Ganonyan, Ido Cooperstein, May Yam Moshkovitz, Yaron Amouyal, David Avnir, and Shlomo Magdassi, *App. Materials Today*, 24, 101083 (2021).

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