# Current Trends in Synthesis and Use of Mesoporous Silica

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Mesoporous silica was first time reported in 1992 and, during the ~3 decades of intensive research and development in the field many new approaches were considered and new applications were identified. Some of the most researched applications are related to the medical, energy and environmental applications but also some les known topics have potential of applications. In this presentation, we will focus on the synthesis, of these mesoporous materials via the classical sol-gel route but also we will consider the actual trends at EU level which means a greener route by using starch instead of the classical CTAB and loading it with a wide range of agents in order to develop materials with potential applications in: the treatment of dysbiosis, food supplements, drug delivery systems, latent fingerprint development, environmental applications, especially pollutants removal; etc. For all these applications a special attention will be paid to the materials design, including the synthesis itself, the chemical surface modification and loading of the proper active agents (dyes, polyphenols, antibiotics, natural oils/extracts, etc).

## References

[1] G. Dolete, C.I. Ilie, C. Chircov, B. Purcareanu, L. Motelica, A. Morosan, O.C. Oprea, D. Ficai, E. Andronescu, L.M. Ditu, Synergistic Antimicrobial Activity of Magnetite and Vancomycin-Loaded Mesoporous Silica Embedded in Alginate Films, Gels-Basel 9(4) (2023).
[2] G. Petrisor, L. Motelica, D. Ficai, R.D. Trusca, V.A. Surdu, G. Voicu, O.C. Oprea, A. Ficai, E. Andronescu, New Mesoporous Silica Materials Loaded with Polyphenols: Caffeic Acid, Ferulic Acid and p-Coumaric Acid as Dietary Supplements for Oral Administration, Materials 15(22) (2022).
[3] G. Petrisor, L. Motelica, D. Ficai, R.D. Trusca, V.A. Surdu, G. Voicu, O.C. Oprea, A. Ficai, E. Andronescu, New Mesoporous Silica Materials Loaded with Polyphenols: Caffeic Acid, Ferulic Acid and p-Coumaric Acid as Dietary Supplements for Oral Administration, Materials 15(22) (2022)
[4] G. Dolete, B. Purcăreanu, D.E. Mihaiescu, D. Ficai, O.C. Oprea, A.C. Bîrcă, C. Chircov, B.Ú. Vasile, G. Vasilievici, A. Ficai, E. Andronescu, A Comparative Loading and Release Study of Vancomycin from a Green Mesoporous Silica, Molecules 27(17) (2022).

## Figures

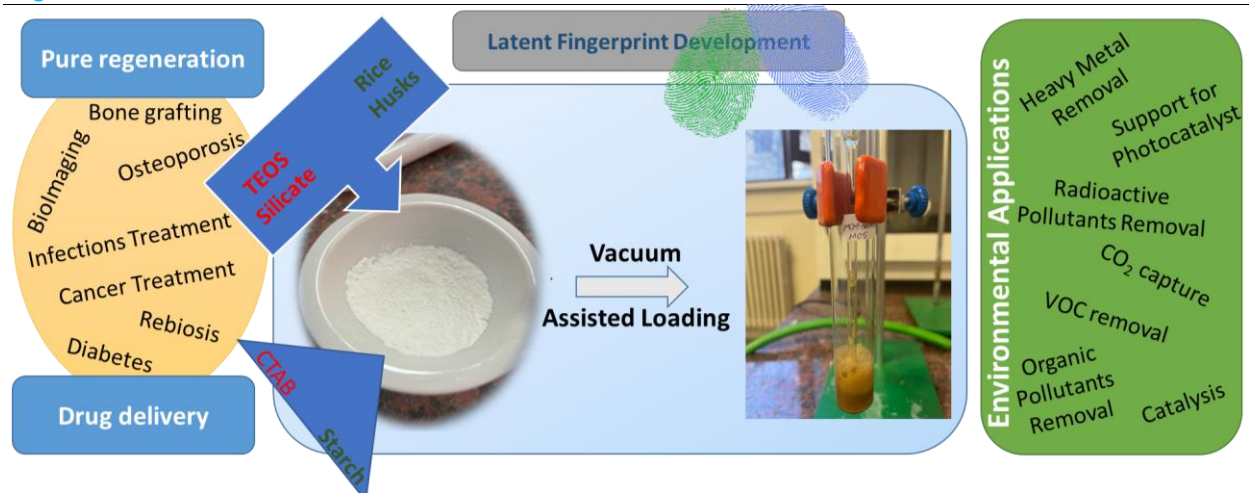


**Figure 1: Current and Emerging Applications of the Mesoporous Materials**