# Effective materials in wastewater treatment: Low cost-, selective-, super- and nano- adsorbent materials

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## Biography

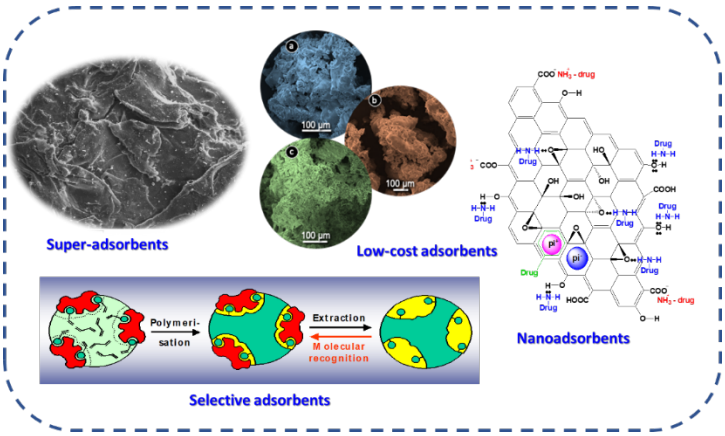
**Dr. George Z. Kyzas is Full Professor at the Department of Chemistry at the International Hellenic University (IHU)**. He was born in Drama (Greece) and studied Chemistry at the Department of Chemistry at the Aristotle University of Thessaloniki (AUTh). He obtained his BSc, MSc, and PhD degrees from the Department of Chemistry (AUTh) expertised in Chemical Technology. He then worked as a PostDoc Researcher at the Department of Chemistry (AUTh) in many research projects. He is now working at the Department of Chemistry (International Hellenic University, Kavala, Greece), **being the Head of the Department (since 2019)**. His research interests include the synthesis and characterization of various (majorly adsorbent) materials (inorganic, aluminates, polymers, graphenes, agro-food residues, nanomaterials, CNTs, etc.) for environmental applications (i.e. treatment of wastewaters).
His scientific work has been published in more than **260 Papers** in international journals with a high impact factor (IF,ave 6.5), while he published **8 Books**, **36 Chapters** in scientific Books and holds **3 Patents**. He was also **8 times Guest Editor** at Special issues of journals and has more than **150 Announcements (Invited)** in International Conferences. His work is widely recognized with **14,500 Citations** (**h-index 67**).
**He is the Editor of the journal "Environmental Science and Pollution Research" (Springer, IF 5.190).**

- **His name is included in the list of Highly Cited Researchers for 2022 (Thomson Reuters - Clarivate WoS) [0.1% most impactful Scientists in the World]**

He has been awarded with scholarships from the Research Committee of the Aristotle University of Thessaloniki (2009, 2013), the Greek State Scholarship Foundation (2013) and the Stavros Niarchos Foundation (2016). He has also participated in about 25 research projects.
He is a Reviewer in more than 200 scientific journals (ACS, Elsevier, Springer, Wiley, Taylor & Francis, etc) and participates as Chair of Expert Panelists and Assessor/Evaluator/Reviewer in National, European and International research proposals/calls/projects.

## Abstract

Sorption is a physical and chemical process by which one substance becomes attached to another. A specific case of sorption is the adsorption; Adsorption is the adhesion of atoms, ions or molecules from a gas, liquid or dissolved solid to a surface. This process creates a film of the adsorbate on the surface of the adsorbent. Adsorption is considered to be a very promising separation technique especially for the removal of pollutants in liquid-phase (dyes, heavy metals, phenols, etc). However, the economic crisis of the 2000s led researchers to turn their interest in adsorbent materials with some special characteristics: (i) super-adsorbent materials of high capacity; (ii) selective adsorbent materials (Molecular Imprinted Polymers – MIPs); (iii) low-cost adsorbent materials; (iv) nano-adsorbent materials. All above can include materials with significant properties beginning from the low-cost and reaching the super-properties. The first class contains many materials as activated carbons, agricultural wastes, modified polymers, graphenes, etc. In the present presentation, experimental data are presented from work of Prof. Kyzas, including the synthesis, characterization and adsorptive evaluation of those materials applied to wastewater treatment. Some indicative classes of materials are: (i) MIPs which are used for specific binding of highly-added value pollutants as precious metals (silver, gold) or drugs for recovery, etc, (ii) activated carbons of high surface area, (iii) polymers (i.e. chitosan) of high capacity; (iv) agro-food wastes of almost low-cost synthesis; (v) nanomaterials (graphenes) of significant properties. In this lecture, a recent summary of this type of works will be presented analyzing in details the next-generation adsorbent materials, discussing many different (maybe in some occasions doubtful) topics such as: (i) adsorption capacity; (ii) kinetic modeling and (iii) desorption/reuse potential.

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