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Abstract: Adsorption processes involving new generation adsorbents can noticeably facilitate the removal of such toxic substances as heavy metal ions, complex anions and various organic pollutants. These new adsorbents include siliceous and carbonaceous mesoporous materials. Their unique adsorption properties are attributable to a high surface area, uniform and accessible pores of desired sizes, a large pore volume and an interconnected structure of pores. The well-developed and active surface of these materials can be easily modified, thus enabling the preparation of adsorbents with desired adsorption properties. It has been demonstrated that the incorporation/embedding of metal, metal oxide and inorganic salt nanoparticles into the siliceous or carbonaceous matrix of these materials may also allow for tailoring their adsorption properties. In this work presented are the available methods for the synthesis of ordered mesoporous siliceous and carbonaceous materials. Special emphasis is placed on the modification methods that allow for the use of mesoporous materials in water treatment. Examples of methods for the synthesis of carbon-based composites with metal, metal oxide and inorganic salt nanoparticles are described, considering the beneficial effect of those materials on the adsorption-based water treatment process. It can be expected that in near future the role of ordered mesoporous carbon and silica materials in water treatment will gain in importance.

Keywords: Ordered mesoporous silica, ordered mesoporous carbons, synthesis, properties, modification, water treatment.