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Utilization of nanomaterials for water treatment

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Water protection is one of the most important tasks of the environmental protection. Its importance is growing especially due to the gradually increasing water shortage. Thus, ensuring sufficient drinking and service water is one of the greatest challenges for humanity. Moreover, quality of surface water is affected by a series of contaminated sources; primarily by industry. Industrial waste water is generally contaminated by various organic and inorganic more or less toxic compounds. Among important indicators of water contamination belong pH, temperature, chemical oxygen demand, suspended solids, ammonia nitrogen, total nitrogen, phosphorus, cyanides, hydrocarbons, heavy metals etc. Total removal of these pollutants is not easy and it is necessary to combine the advanced oxidation techniques with the classical separation processes. Waste water can be cleaned by various chemical, physico-chemical and biological methods. Nevertheless, these techniques are not able to clean waste water sufficiently. There are plenty of water-soluble substances, based on hormones, which cannot be removed by conventional techniques. Therefore, the final purification ranks among the urgent tasks. This work is focused on preparation and characterization of various nanomaterials applied in sorption, oxidation, electrocoagulation and photocatalysis techniques. The main aim is the study of their effective combination and activity testing in purification processes.

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