

Titanium Dioxide for Hydrogen Economy: a Brief Review

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Abstract. Our research is mainly focused on solving problems related to the production of hydrogen and its storage, as well as the creation of autonomous energy systems using renewable energy sources. Technological solutions for green energy depend on the development of new materials with desired properties that are able to reversibly accumulate hydrogen under appropriate environmental conditions (temperature, pressure) and on the technological processes allowing to obtain molecular hydrogen without significant energy consumption. The creation of materials with fundamentally new characteristics is inextricably linked with the production of nanoscale systems with properties that are controlled at the atomic and molecular level. The review considers the results of studies on the possibilities of using various nanostructures of titanium dioxide known for its catalytic properties and high stability in various applications of hydrogen energy. Much attention is paid to the promising direction of solid-state storage of hydrogen using hydride pastes and high-entropy alloys.

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