

Dissertation press release

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Novel nanocomposite fuel cells as clean energy sources

Title of the dissertation	Analysis of single-layer and three-layer nanocomposite fuel cells Yksi- ja kolmikerroksisten nanokomposiittipolttokennojen analysointi
Contents of the dissertation	<p>Fuel cells convert electricity from hydrogen with a high efficiency, which makes them intriguing candidates for the clean energy production in the future. The performance of the novel nanocomposite fuel cells can be improved significantly by studying systematically their working principles, nanostructures and the factors affecting to their performance.</p> <p>Ceramic nanocomposite fuel cell (CNFC) consists of three layers. The ionic conductivity of the middle layer, the electrolyte, is improved by mixing a salt, typically an alkali carbonate mixture, to the solid oxide. Single-layer fuel cell (SLFC) is a fresh innovation where the traditional three-layer structure is replaced by a single functional layer, simplifying the manufacturing procedures.</p> <p>In this Thesis the performance and structure of CNFC was studied by macroscopic and microscopic methods. Significant power density was achieved with two different CNFCs. The SLFC research focused on studying the working principles, such as dominating charge carriers, and performing a systematic study on the factors affecting the cell performance.</p>
Field of the dissertation	Engineering Physics, Energy Science
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