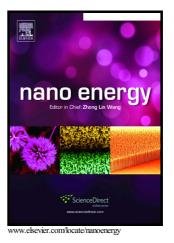
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Hydrogen Battery Using Neutralization Energy

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Abstract

Low-cost, non-toxic and environment-friendly electrochemistry is highly needed for clean energy storage technologies. Here we propose a most simple rechargeable *pH* differential hydrogen battery using neutralization energy as an efficient energy storage system to utilize renewable energy and waste acid/base. The overall battery reaction can be simplified as follow: $2H^+ + 2OH \xleftarrow{\text{discharge}}{\text{charge}} 2H_2O$. This proposed hydrogen battery can deliver a theoretical specific energy of up to 250 Wh kg⁻¹ and a maximum energy density of up to 355 Wh L⁻¹, very high values among aqueous battery systems. We show adding excessive amount of NaClO₄ can lead to effective *pH* maintenance, higher coulombic efficiency, higher power and more stable cyclic performance at 9 mA cm⁻². This work offers new opportunities to Download English Version:

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