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Stabilization of Ti-Zr-Ni quasicrystals by hydrogen and application as renewable energy storage materials[1] SANG-HWA LEE, JAE-KYUN JEON, SOO-BIN CHOI, JAE-YONG KIM, Hanyang University, INST TEAM — We prepared quasicrystal samples by rapidly quenching of $Ti_{50-x}Zr_{30+x}Ni_{20}$ alloys (where $0 \leq x \leq 10$), and measured equilibrium vapor pressures of hydrogen using a lab-built computer-controlled-absorption apparatus at elevated temperatures. To activate the hydrogen absorption, we removed a thin oxygen layer on the surface of the sample by using a plasma etching in a partial pressure of Ar and applied an immediate thin Pd coating by using a physical vapor deposition. As a result, the equilibrium vapor pressures of hydrogen in the QCs were lower than 5 Torr at below 300°, and were increased as lowering the temperature. The maximum value of the H/M was also increased as increasing the temperature. Interestingly, the coherence length of the QCs was increased from 180 to 270 ? as performing the absorption/desorption cycling at elevated temperature suggesting that diffusion of hydrogen might enhance the stability of QCs structure. An applaud explanation about the relation of increased coherence length with hydrogen diffusion in QCs will be discussed.

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