

Experimental Study on the Molecular Spring Isolator

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Abstract : As a novel passive vibration isolation technology, molecular spring isolator (MSI) is investigated in this paper. An MSI consists of water and hydrophobic zeolites as working medium. Under periodic excitation, water molecules intrude into hydrophobic pores of zeolites when the pressure rises and water molecules extrude from hydrophobic pores when pressure drops. At the same time, energy is stored, released and dissipated. An MSI of piston-cylinder structure was designed in this work. Experiments were conducted to investigate the stiffness properties of MSI. The results show that MSI exhibits high-static-low dynamic (HSLD) stiffness. Furthermore, factors such as the quantity of zeolites, temperature, and ions in water are proved to have an influence on the stiffness properties of MSI.

Keywords : hydrophobic zeolites, molecular spring, stiffness, vibration isolation

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