Synthesis of Silicon-based Ferrofluid and Application to Vibration Reduction

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ABSTRACT

Magnetic fluid constitutes ferrite particle,surfactant and carrier.The ultra-fine particles with strong magnetism can disperse stably in the liquid due tothe action of the surfactant. If the carrier is silicon oil,it is called a silicon-based ferrofluid. For this research,we synthesize a series of Fe3O4 silicon-based ferrofluidwith various concentrations by coprecipitation method.The conditions of thechemical reaction were carefully tuned to obtain the optimum ones.The ferrofluidproduced accordingly are highly stable with high magnetization. Then we apply to linear dampers using different concentration silicon-based ferrofluids.The effectsof these dampers to vibration reduction were sutdied. The main idea of this research project is to utilize the properties of magtneticfluids in order to improve the imperfection of traditional dampers.Because of the attractive force due to a magnetic field on magnetic fluid and the repulsive forcebetween magnetic fluid and non-magnetic material, the clearance between damperparts will be ensured in order to prevent the excessive wear. This wear is due to friction which happens frequently in traditional dampers.This type of highlyefficient dampers can be used to reduce vibration level of communication products,highly accuracy machines, cars,and so on. In the meantime,the results of this project can be use as a reference of the design of magnetic fluid damper for industries.

Keywords : ferrofluid ; coprecipitation method ; damper

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