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超声法制备纳米SiC颗粒增强AZ61镁基复合材料的显微组织

胡 志，闫 洪，聂 俏，凌李石保

(南昌大学 先进成形制造及模具研究所，南昌 330031)

摘 要：采用高能超声方法制备纳米SiC颗粒增强AZ61镁基复合材料，通过SEM和XRD技术对复合材料的微观组织和成分进行研究与分析。在Lennard-Jones势函数的基础上对超声分散纳米颗粒进行了理论探讨。结果表明：在超声作用下，质量分数为1%的纳米SiC颗粒在AZ61镁合金中得到弥散分布；颗粒之间存在的范德华力使得颗粒连接在一起，范德华力与颗粒半径和颗粒间距离的关系表明：直径为100 nm的SiC颗粒之间最大的范德华力约为135 nN，分散团聚纳米颗粒的最小压强约为17.2 MPa。

关键字：AZ61镁合金；纳米SiC；超声振动；显微组织

Microstructure of SiC nanoparticles reinforced AZ61 magnesium composites fabricated by ultrasonic method

HU Zhi, YAN Hong, NIE Qiao, LING Li-shi-bao

（Institute of Advanced Forming & Manufacturing and Die & Mold, Nanchang University, Nanchang 330031, China）

Abstract: SiC nanoparticles reinforced AZ61 magnesium composites were fabricated by ultrasonic method. The microstructure and components of the composite were investigated by scanning electron microscopy (SEM) and XRD. Based on the Lennard-Jones potential function, the theory of dispersion nanoparticles by ultrasonic were also discussed. The results show that 1.0% (mass fraction) SiC nanoparticles can be dispersed very well in AZ61 magnesium matrix by ultrasonic dispersion. The particles are joined by van der Waals force. The relationships among van der Waals force, the radius and the distance between particles show that the maximal van der Waals force is approximately 135 nN between SiC nanoparticles with diameter of 100 nm. The minimal pressure to separate the agglomeration nanoparticles is approximately 17.2 MPa.

Key words: AZ61 magnesium alloy; SiC nanoparticles; ultrasonic method; microstructure

地 址：湖南省长沙市岳麓山中南大学内 邮编： 410083

电 话： 0731-8876765，8877197，8830410 传真： 0731-8877197

电子邮箱： f-ysxb@mail.csu.edu.cn