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研究论文

hBN表面镀Ni对Ni--20Cr/hBN自润滑材料性能的影响

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摘要: 以六方BN(hBN)、NiCl2和NaCO3为原料, 采用沉淀法制备镀镍hBN粉末, 并采用粉末冶金法制备Ni--20Cr/hBN自润滑复合材料。研究了镀镍hBN粉末对Ni--20Cr/hBN复合材料密度、孔隙率、硬度、抗弯强度以及摩擦磨损性能的影响。结果表明: 固体润滑剂hBN表面镀Ni可提高Ni--20Cr/hBN复合材料的致密度和力学性能。其密度由5.43 g/cm3提高至5.68 g/cm3, 孔隙率由22.13%降低至18.55%, 抗弯强度由70.48 MPa提高至99.42 MPa, 硬度由18.82 HB提高至21.02 HB。采用镀镍hBN粉末制备的Ni--20Cr/hBN复合材料具有宽温带减摩性, 在常温和600℃下测试时, 摩擦系数变化不明显, 而在600℃时磨损率由462.18 mg/min降低至204.4 mg/min。

关键词: 复合材料 Ni--20Cr/hBN 自润滑材料 沉淀法 摩擦磨损性能

Effects of hBN Surface Plated Nickel on Properties of Ni-20Cr/hBN Self-lubricating Composites

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Abstract: Hexagonal boron nitride (hBN) powder was plated with nickel layer by the deposition process with the raw materials of hBN, NaCO3 and NiCl2. The Ni－20Cr/hBN self－lubricating composites were prepared by powder metallurgy with the hBN powder coated Ni and common hBN. The effects of hBN coated with Ni on density, porosity, hardness, strength and the tribological properties of the Ni－20Cr/hBN composites were studied. The results show that the Ni－20Cr/hBN composite with the hBN coated with Ni has better mechanical properties and lower porosities. The density, bending strength and hardnes increase and the porosity decreases. Besides, the composite with hBN coated with Ni has better anti-friction performance in a wide temperature region. At room temperature and 600^{o}C, the friction coefficient changes less, while the wear rate decreases at 600 ^{o}C.

Keywords: composites Ni－20Cr/hBN self－lubricating composites deposition process tribological properties

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