

论文

壳-芯型复合陶瓷材料的制备及其电磁特性

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摘要 为了提高吸波剂对电磁波的吸收性能, 采用溶胶-凝胶法制备了表面包覆有一定厚度的炭黑薄膜的钛酸钡复合粒子. 并利用XRD和TEM方法对其形貌结构进行了分析; 同时研究了复合粒子的导电性能、电磁参数以及对电磁波的吸收性能. 结果表明: 钛酸钡颗粒的直径在50~70nm之间, 包覆层厚度为10~20nm. 包覆工艺显著改善了材料的导电性能并提高了介电常数, 而且随着复合粒子在吸波材料基体中的含量不同, 对电磁波的吸收性能也有着不同的影响: 当吸收材料中复合粒子含量达到或超过20wt%时, 复合粒子明显改善了吸收材料对电磁波的吸收性能.

关键词 [壳-芯型结构](#) [钛酸钡](#) [炭黑](#) [复合陶瓷](#) [电磁性能](#)

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Synthesis of Compound Ceramic with Shell-core Structure and Its Electromagnetic Characters

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Abstract In order to improve the microwave absorption of the absorber, the compound particles of barium titanate coated with carbon black were synthesized by a sol-gel method. The microstructure and morphology of the compound powders were characterized, and dielectric properties and microwave absorption property of the composite were investigated. XRD and TEM results show that carbon black nano-films are well coated on the surfaces of barium titanate particles. The barium titanate particles are spherical, loosely agglomerate with sizes in the range of 50--70nm, and the coated film is 10--20nm thick. The dielectric and microwave absorption properties of the compound particle are improved. The results indicate that compound particles have different effects on the microwave absorption performance of the composites with different compound particle contents. When the weight content of compound particles filling to epoxide resin matrix exceeds 20wt%, the microwave absorption performance of the composite with the compound particles and epoxide resin can be improved greatly.

Key words [shell-core structure](#) [barium titanate](#) [carbon black](#) [compound ceramic](#) [electromagnetic](#)

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