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Nd(OH)₃-Co₃O₄-Nb₂O₅纳米复合掺杂和传统复合掺杂BaTiO₃基陶瓷性能的对比研究

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The comparative study of Nd(OH)₃-Co₃O₄-Nb₂O₅ nano-doped and traditional-doped barium titanate ceramics

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摘要 制备了Nd(OH)₃,Co₃O₄和Nb₂O₅纳米粒子以及Nd(OH)₃-Co₃O₄-Nb₂O₅纳米复合掺杂和传统复合掺杂BaTiO₃基陶瓷,研究了掺杂剂的粒径对BaTiO₃基陶瓷的微观形貌和介电性能的影响,并对纳米掺杂和传统掺杂BaTiO₃基陶瓷的性能进行了比较.结果表明,掺杂剂的粒度对BaTiO₃基介电陶瓷的微观形貌和介电性能有较明显的影响,特别是纳米复合氧化物掺杂能够促进烧结中晶粒“芯-壳”结构的形成,能有效地抑制晶粒长大并形成细晶结构,从而显著地降低烧结温度,提高介电常数、降低介电损耗,改善BaTiO₃基陶瓷的温度稳定性.

关键词: 单分散纳米粒子 复合掺杂 BaTiO₃

Abstract: The monodisperse Nd(OH)₃,Co₃O₄,Nb₂O₅ and nano complexly doped BaTiO₃ ceramics was prepared and the effect of particle size of nano-dopant on the microstructure and dielectric properties of nano-doped BaTiO₃ was investigated.Finally,nano-doped BaTiO₃ and doping process were compared with the traditional.The results show that the dopant particle size on the dielectric BaTiO₃-based ceramics microstructure and dielectric properties have a more significant impact,especially in nano-composite doped can promote the sintering of crystal particles "core-shell" structure formation,and can effectively inhibit grain growth and the formation of fine grain structure,and thus significantly reduce the sintering temperature,increase the dielectric constant,depress dielectric loss and improve the temperature stability of BaTiO₃-based ceramics.

Key words:

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