

Room temperature ferromagnetic behavior of GaN nanoceramics

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The effect of grain size of GaN nanocrystallites subjected to high pressing has been manifested in a strong deformation of grains of nanoceramics. The most surprising result was observed for the GaN nanoceramics built from the largest grains characterized by strongest deformation which demonstrated the superconducting like behavior. In the present work we have focused on the effect of applied pressure on magnetic properties of GaN nanoceramics. It is shown that the GaN nanoceramics fabricated by low temperature high pressure technique exhibit the room-temperature ferromagnetic behavior. Our measurements reveals that the magnetization of GaN nanoceramics increased with the sintering pressure applied in fabrication process of nanoceramics. It is concluded that for observed increase of ferromagnetism is responsible the magnetostriction mechanism. The magnetization of GaN nanoceramic measured at 2 K decreases nonlinearly with applied pressure by two order of magnitude reaching a minimum at 4 GPa. It was found that magnetization of GaN nanoceramics demonstrates hysteric behavior characteristic to giant magnetostrictive material.