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Superconducting properties of VN-SiO₂ sol-gel derived thin films

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In this work studies of structure and superconducting properties of VN-SiO₂ films are reported. The films were obtained through thermal nitridation (ammonolysis) of sol-gel derived V₂O₃-SiO₂ coatings (in a proper V₂O₃/SiO₂ ratio) at 1200°C. This process leads to the formation of disordered structure with VN metallic grains dispersed in the insulating SiO₂ matrix. The structural transformations occurring in the films as a result of ammonolysis were studied using X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS). To examine the influence of magnetic field on superconducting properties of the films, the resistance versus temperature was measured in high magnetic fields.