

High Current Density Impregnated Scandate Cathode for Terahertz Vacuum Devices

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To meet the demand of terahertz devices, we develop a new type scandium aluminate impregnant. Scandium aluminate was synthesized *via* solid phase mixing and sintered in air atmosphere. Powder X-ray diffraction (XRD) measurement and Rietveld refinement revealed that scandium aluminate impregnants is Ba₅CaAl₄O₁₂Phase with Ba₂ScAlO₅ secondary phase. The Current-Voltage characteristics of this impregnated scandate cathode was measured in the DC mode and the maximum current density is 17.6 A/cm² occurring at 1100°C for the applied voltage from 0 to 540 V. It illustrates that the scandate aluminate impregnant is promising for applications in THZ electronic devices.