Commercial TaC and Si3N4 powders were tested as possible electrocatalyst support materials for the Oxygen Evolution Reaction (OER) for PEM water electrolyzers, operating at elevated temperatures. TaC and Si3N4 were characterised by thermogravimetric and differential thermal analysis for their thermal stability. The Adams fusion method was implemented to deposit IrO2 on the support surfaces. A series of electrocatalysts was prepared with a composition of (IrO2)x(TaC/Si3N4)1-x, where x represents the mass fraction of IrO2 and was equal to 0.1 (only for TaC), 0.3, 0.5, 0.7, 0.9 and 1. The thin-film method was used for electrochemical analysis of the prepared electrocatalysts. SEMEDX, BET and powder conductivity measurements were used as complementary techniques to complete characterisation of the electrocatalysts. Additionally, they were compared in their properties with previously reported data for a SiC-Si support. The stability of the electrocatalysts was assessed by estimation of reversibility of the anodic/cathodic processes.