Characteristics of $Sr_{0.92}Y_{0.08}Ti_{1-x}V_xO_{3-\delta}$ anode for using H_2S fuel in solid oxide fuel cells

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SYTV ($Sr_{0.92}Y_{0.08}Ti_{1-x}V_xO_{3-\delta}$) with perovskite structure was investigated as an alternative anode to utilize hydrocarbon fuels in SOFCs (Solid Oxide Fuel Cells). Ti at the B-site of the perovskite was partially substituted to V varying with 1~7 mol.%. The SYTV systhesized by Pechini method was chemically compatible with YSZ electrolyte with no interlayer by0products formation. As increasing the V dopant in SYT, the more oxygen vacancies introduced in the anode leading to improving the ionic conductivity. In addition, the sulfur tolerant property of the anode was increased by V doping in the SYT ($Sr_{0.92}Y_{0.08}TiO_{3-\delta}$). The cell performances in pure H_2 at 850℃ were 19.30 mW/cm^2 and 34.89 mW/cm^2 in 1 mol.% and 7 mol.% of V doping in the SYT anode, respectively. In H_2 fuel containing H_2S of 1000 ppm, the maximum power densities of the cells showed 23.34 mW/cm^2 and 73.11 mW/cm^2 in 1 mol.% and 7 mol.% of V doping in the SYT anode, respectively.