EPD를 이용한 IT-SOFC용 SDC 전해질 필름의 제조

*이 경섭[1], 김 영순[1], 조 철기[1] **신 형식[1]

Preparation of SDC electrolyte film for IT-SOFCs by electrophoretic deposition

*Kyeongseop Lee, Chul gi Jo, Young-soon Kim **Hyung-Shik Shin

Abstract : The electrophoretic deposition(EPD) technique with a wide range of novel applications in the processing of advanced ceramic materials and coatings, has recently gained increasing interest both in academic and industrial sector not only because of the high versatility of its use with different materials and their combinations but also because of its cost-effectiveness requiring simple apparatus. Compared to other advanced shaping techniques, the EPD process is very versatile since it can be modified easily for a specific application. For example, deposition can be made on flat, cylinderical or any other shaped substrate with only minor charge in electrode design and positioning[1]. The synthesis of the nano-sized Ce0.2Sm0.8O1.9(SDC)particlespreparedbyaurea-basedlowtemperaturehydrothermalprocesswasinvestigatedinthisstudy[2].When we made the SDC nanoparticles,changed the time of synthesis of the SDC. The SDC nanoparticles were characterized with field-emission scanning electron microscope(FESEM), energy dispersive X-ray analysis(EDX), and X-ray diffraction(XRD). And also we researched the results of our investigation on electrophoretic deposition(EPD) of the SDC particles from its suspension in acetone solution onto a non-conducting NiO-SDC substrate. In principle, it is possible to carry out electrophoretic deposition on non-conducting substrates. In this case, the EPD of SDC particles on a NiO-SDC substrate was made possible through the use of a adequately porous substrate. The continuous pores in the substrates, when saturated with the solvent, helped in establishing a “conductive path” between the electrode and the particles in suspension[3-4]. Deposition rate was found to increase its increasing deposition time and voltage. After annealing the samples 1400°C, we observed that deposited substrate.

Key words : solid oxid fuel cell(고체산화물 연료전지), intermediate(중저온), electrolyte(전해질), EPD(전기영동증착)

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