

卓越した大学院拠点形成支援補助金

「流動ダイナミクス知の融合教育研究世界拠点」

平成 25 年度 博士課程後期学生（国内）学会等派遣 参加報告書

氏名／専攻・学年 Name / Department	Kang-il LEE / Mechanical Engineering
学会名 Conference's name	Conference of Japan Thermal Spray Society
開催地 Venue (Name of the facility, city & country)	Creator's plaza, Osaka
日程 Conference period	2013/11/18 - 19
発表タイトル Presentation Title	Effect of Nickel Powder Mixing on the Deposition Efficiency of Cold Sprayed CoNiCrAlY Coatings
<p>【発表概要 Brief summary of your presentation】</p> <p>The effect of nickel powder mixing on CoNiCrAlY coatings has been investigated in this present study. CoNiCrAlY coatings, which have resistance of high temperature oxidation and hot corrosion, are commonly applied with low pressure plasma spray (LPPS) and high velocity oxygen fuel (HVOF). Recently, cold spray has been considered as a new coating process for making CoNiCrAlY coatings. However, expensive helium (He) gas has to use for CoNiCrAlY coatings. In this study, in order to reduce the production cost and to improve the deposition efficiency of CoNiCrAlY coatings, pure nickel (Ni) was mixed to the CoNiCrAlY, and then this powder was sprayed using cheap nitrogen (N₂) gas. As the results, the CoNiCrAlY containing nickel power can be produced by cold spray using N₂, as well as deposition efficiency is also increased. The microstructural characterization and phase analysis of feedstock powders and as-deposited coatings were carried out by scanning electron microscope (SEM) and energy-dispersive X-ray spectroscopy (EDX). As-spread coating was clearly observed the boundaries between nickel and CoNiCrAlY. Also, significant level of CoNiCrAlY powder was encapsulated in the coating. After heating at 1000℃, most of boundaries were disappeared and many pores were generally observed in the coating layer by diffusion of powders. However, the oxidation continues, most of pores were moved toward the top of coating. Therefore, the porosity was decreased, as well as the hardness was increased. Moreover, for comparison with other methods such as LPPS, high temperature oxidation behavior of the obtained coatings was evaluated.</p>	

【他の講演等から得られた知見、感想等。What you learned from other presentations, general impression you had, etc.】

There were many new researches about spraying. Especially, I was interested in cold spray like me. They presented about Fabrication of the Al/Si composite coating by cold-spray and Effect of Substrate Temperature on Adhesion Strength of Metal Coating on Ceramic Substrates in Cold Spray. Normally, it is very difficult to coat ceramic on the metal substrates because of low ductility. However, in that research, it was success to coat metal on the ceramic coating. It was very special results.

Recently, almost all researchers were interested in energy and high quality coating. So, there are many researchers studying about gas turbine. Nowadays, in gas power plant, newer engine was required increased turbine inlet temperature to improve thermal efficiency and reduce the emission of carbon-dioxide. However, the failures of the super-alloys in gas turbine engine, such as melting, creep and oxidation at high temperature, were occurred. To prevent these problems, their surface temperature must be protected through thermal barrier coatings (TBCs). So, many researchers presented to increase bond strength and low thermal conductivity by TBCs. For TBCs, there are many methods. In this conference, mainly, HVOF, HVOF and LPPS were presented to fabricate TBCs.

Also, JIS committee came to introduce and inform JIS. They were presented about difference and recent field of JIS and ISO.

This conference was very useful to me.