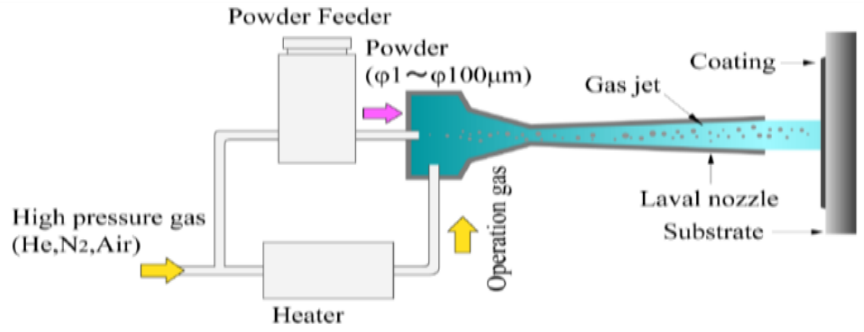
Tohoku Univ. Technology

Polymer coating by cold spray method

Easy to coat polymer which is difficult to mold by injection



Schematic illustration of cold spray system

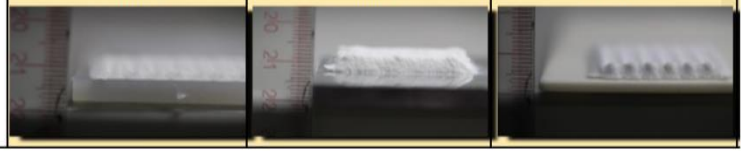
Overview

Ultra-high molecular weight polyethylene (UHMWPE) is a material with excellent impact resistance, wear resistance, etc. However, due to poor flowability at high temperature, the injection molding, which is a common molding method for polymer, was not simple to use.

Therefore, ceramic nanoparticles (alumina, etc.) were mixed to UHMWPE, then deposited by the cold spray technique. This method has succeeded to form a thick film easily. It is expected that other polymers can be deposited in the same way by mixing ceramic nanoparticles.

Example of film deposition

		Substrate					
		PP		Al		Al_2O_3	
1	Spray Condition	Gas Temperature	100-150°C	Gas Temperature	100-150°C	Gas Temperature	100-150°C
		Gas Pressure	0.2-0.8MPa	Gas Pressure	0.2-0.8MPa	Gas Pressure	0.2-0.8MPa
	Observation	Thin coating of UHMWPE observed		Mostly rebound of UHMWPE particles with little or no deposition		Mostly rebound of UHMWPE particles with little or no deposition	
2	Spray condition	Gas Temperature	150°C	Gas Temperature	250°C	Gas Temperature	250°C
		Gas Pressure	0.3MPa	Gas Pressure	0.4MPa	Gas Pressure	0.4MPa
	Observation	Approx. 1mm thick coating		Approx. 4mm thick coating		Approx. 3-4mm thick coating	



Product Application

- Coating the base material (polypropylene, aluminum, aluminum oxide)
- Coating that avoids thermal denaturation of polymer particles
- Coating with chemical resistance, etc.

Related Works

[1] OGAWA Kazuhiro, Development of Polymer Coatings by Cold Sprayed Technique. JOURNAL OF THE JAPAN WELDING SOCIETY. 2013, Vol.82, No.8, p.5-8

IP Data

IP No. : JP6341505
Inventor : OGAWA Kazuhiro
Admin No. : T14-018

Contact

Tohoku Techno Arch Co., Ltd.
Please visit CONTACT here