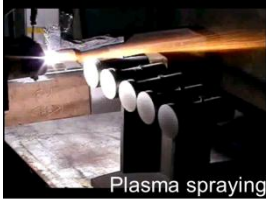


## Syllabus

Fundamentals and application of thermal spray coatings for energy and environment



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As the demands for higher efficiency and longer service life are becoming more critical for all the industrial plants, transportation vehicles and airplanes, and infrastructures, it is not possible to find a material that can satisfy various functions/requirements such as mechanical properties (strength, toughness, fatigue, and creep etc.) and environmental properties (heat, corrosion, and wear resistance, etc.) simultaneously. In order to meet such requirements, surface engineering of structural materials has become more important and significant efforts have been made to progress in recent years.

Thermal spray is one of such surface modification techniques and widely used for deposition of thick coatings onto substrates by spraying molten or semi-molten feedstock particles. Also, thermal spray technique has a long history used for restoring worn-out engineering components such as shafts, hydraulic cylinders, paper mill rolls, etc. Due to its flexibility in materials selection and high deposition rate, thermal spray technique has been recognized as one of the most cost-effective option to extend the life of components.

In this lecture, the following five topics will be given to provide the student with technical backgrounds of thermal spray, successful applications in industry, some emerging new processes, mechanical tests of coating adhesion, and nondestructive evaluation for reliability assessment.

1. Overview and fundamentals of thermal spray technology
2. Case study: Thermal barrier coatings (TBC) and Wear resistant coatings
3. New thermal spray processes
4. Evaluation of coating adhesion/interfacial toughness
5. Review of nondestructive evaluation (NDE) techniques