COMPOSITE DISCHARGE ELECTRODE SYSTEM

TECHNOLOGY OVERVIEW

The invention is a new design of constructing charging electrodes using composite materials such as carbon nano-fibers and glass fibers in combination with polymers. The primary goal of the technology is to produce low cost composite electrodes that are corrosion resistant. Composites are much lighter than metals – so the weight of the electrodes is also reduced. It provides a highly effective alternative to replace the expensive charging electrodes used in equipments such as ESPs (Electro-Static Precipitators). It uses rods or tubes made of inexpensive polymers and polymer matrix composites. Materials such as silicon carbide can be used to increase the operating temperatures. The composite electrode can also be made of a combination of metal discharge points supported on a polymer or polymer matrix composite. Composites have high strength and can be used to fabricate electrodes of high durability and long operating lives.

POTENTIAL FIELDS OF USE

The technology has strong potential applications in the pollution control from boiler exhausts, ESP (specially wet ESPs) and air-purifiers. Composite materials are becoming increasingly popular among various manufacturing processes that use electrodes. ESPs are widely used to remove particulate matter from the stacks of coal fired power plants. ESP components currently form a $1.5 billion world-wide market, aided by huge global investments. Also, the operations and maintenance (O&M) of ESPs is a $3 billion annual expenditure on a global scale. The technology could help provide savings in the O&M costs due to high strength and corrosion-resistant properties of the electrodes. The US has the largest share in the demand for ESP and its sub-components.

BENEFIT ANALYSIS

The new process has several advantages over other commercially available charging electrodes:

- Improvement in the charging characteristics of the electrode.
- Lower cost of the electrodes due to use of inexpensive, lighter materials and simpler design.
- Lower cost of overall equipment as the cost of support structure is eliminated/ reduced.
- Variation in the composition and physical configuration of the electrodes is feasible depending on the requirements and conditions of their operation.
- Collection efficiency is improved due to improvement in the airflow pattern.
- Corrosion resistance in environments that would adversely affect metallic electrodes.

STAGE OF DEVELOPMENT

Composites electrodes of different designs have been fabricated and tested under a set of varying conditions to determine their performance. Tests were performed to determine the voltage-current (V-I) characteristics and the collection efficiency of the electrodes. It was observed that electrodes manufactured from composite materials had improved corona current at varying voltage levels and greater particle collection efficiency as compared to expensive stainless steel electrodes.

FUTURE DEVELOPMENT

The technology stands at an advanced stage of development and is ready to be used in a pilot plant. Researchers are working to develop the range of composite materials that can be commercially useful. Also, further testing on the electrodes will be performed to validate their efficiency over a range of physical conditions.

LICENSING OPPORTUNITIES

The patent application for this technology has been filed. Licensing opportunities are available.

For more information contact:
Ohio University
Technology Transfer Office
340 West State Street, Unit 11, Athens, OH 45701
T: 740.593.0462. F: 740.593.0186

OHIO UNIVERSITY