

# COMPOSITE DISCHARGE ELECTRODE SYSTEM

OU ID: #04023

## Overview

The invention is a new design for 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.



## Commercial Application

The technology has strong potential applications in the pollution control from boiler exhausts, ESPs (especially when wet), 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 exhaust 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 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.



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## Benefits

- Improvements 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 the improvement in the airflow pattern
- Corrosion resistance in environments that would adversely affect metallic electrodes

## About the Inventor

Khairul Alam, Ph. D. is a Moss professor of mechanical engineering at Ohio University's Russ College of Engineering and Technology. Additionally, he serves as the Director of the Center for Advanced Materials.



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