

**PROCESS FOR PRODUCING CATALYST LAYER WITH BIOCHAR-BASED CARBON
SUPPORT AND INTEGRATED PLATINUM**

ABSTRACT OF THE DISCLOSURE

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The present utility model relates to a process for producing a catalyst layer for proton exchange membrane fuel cells (PEMFCs). The process involves dispersing biochar derived from water hyacinth (*Eichhornia crassipes*) in a solvent to form a carbon solution, homogenizing the carbon solution, integrating a platinum catalyst, sonicating the mixture, incorporating a polymeric binder, coating the resulting suspension onto a substrate, and drying to obtain the catalyst layer. This process enables the uniform dispersion and stable integration of platinum into the biochar-based carbon support, resulting in a catalyst layer with enhanced electrochemical activity, self-supporting structure, uniform morphology, and durability under oxidative and thermal conditions, making it suitable for PEMFC applications.

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