Patent Search

Invention Title	Carbon Purification Model For Industrial Air Emission Control
Publication Number	20/2026
Publication Date	15/05/2026
Publication Type	INA
Application Number	202641057344
Application Filing Date	06/05/2026
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	CHEMICAL
Classification (IPC)	B01D 53/04, F24F 11/00, F24F 11/64, B01D 46/00, F24F 110/64

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Abstract:

The present disclosure relates to systems and methods for industrial air emission control, and provides a Carbon Purification Model (100) that integrates a multi-stag based air purification and smart monitoring arrangement capable of continuously detecting harmful gas concentrations and automatically initiating corrective action Carbon Purification Model (100) includes an ESP32 microcontroller unit (102), a MQ2 gas sensor (104), a MQ7 carbon monoxide sensor (106), and an activated carbon unit (122) operatively coupled to a DC exhaust fan (114) driven through an L298N motor driver (112). The carbon purification model (100) is configured to monitor po in real time and, upon threshold exceedance, simultaneously activate mechanical air handling and transmit timestamped emission data via a ThingSpeak IoT platforn (118), thereby removing particulate matter and toxic gases including carbon monoxide, sulphur dioxide, and nitrogen oxides from industrial air emissions.

Complete Specification

Description:TECHNICAL FIELD
[001] The present invention relates to the field of industrial air emission control and environmental engineering, particularly to an IoT-enabled air quality monitorin carbon-based air purification system. More particularly, the present invention relates to a Carbon Purification Model for real-time detection and removal of particul matter and toxic gases from industrial emissions.
BACKGROUND
[002] Industrial air emissions represent one of the most pressing environmental and public health challenges associated with rapid urbanization and expanding manufacturing activity. Gaseous pollutants including carbon monoxide, sulphur dioxide, nitrogen oxides, and volatile organic compounds, together with fine and co particulate matter, are routinely discharged into the atmosphere by small and medium-scale industrial facilities. Prolonged or acute exposure to such pollutants is associated with severe respiratory, cardiovascular, and neurological health consequences, particularly in enclosed or semi-enclosed industrial environments where pollutant concentrations may accumulate to hazardous levels over short periods.
[003] Conventional carbon-based air filtration systems have been developed for large-scale industrial installations and typically require substantial capital investme dedicated infrastructure, and significant installation space. Such systems may consume considerable electrical power and are often operated manually or through f non-adaptive control schemes that do not respond dynamically to real-time changes in pollutant concentrations. The physical footprint and associated civil enginee requirements of such equipment may render them unsuitable or economically impractical for small and medium-scale industrial applications, where space and cap typically constrained

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Page last updated on: 26/06/2019