

Vehicle Exhaust Conical Filtering Device for Capturing Greenhouse Gases (GHGs) and PM 2.5 Emissions With Monitoring and Notification Alert System

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Transportation significantly contributes to greenhouse gas (GHG) and PM 2.5 emissions, adversely impacting the environment. This study presents a novel conical filtration device, designed to reduce vehicle emissions, including CO₂, CO, CH₄, and PM 2.5. The device incorporates zeolites and activated carbon for effective filtration, while an Arduino microcontroller, programmed using Arduino IDE, enables real-time monitoring of emission levels with various sensors (SCD30 Sensirion, MQ-7, MQ-4, and a PMS 5003 sensor). Initial testing demonstrates a notable reduction in pollutants – between 50% to 60%. Furthermore, the integrated Monitoring and Notification System efficiently tracks vehicle emissions in real-time and provides timely alerts on GHG and PM 2.5 levels. This innovation showcases a significant step forward in environmental technology, offering a dual benefit: effective filtration of harmful emissions and real-time data for monitoring vehicle pollution.

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