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.