

ENHANCING AIR QUALITY FOR A SUSTAINABLE AVIATION

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Abstract

Air quality define as a measure of the concentration of air pollutants at a given location. In addition to the safety factor, environmental protection is one of the key issues to be considered during the aircraft operations. As per the literature total CO₂ aviation emissions are approximately 2% of the Global Greenhouse Emissions and it is increasing 3 - 4% per year. Hence the scientists' area looking for several types of standards and practices to reduce engine emissions. As according to the sustainable aviation, it is important to focus on reduction of emissions to improve air quality where it matters most. The principal sources for air pollution in airport consist with the emissions from aircraft and also when operating ground service equipment such as power units and vehicles. The highest share of total airport related emissions happens from aircraft operations on the ground such as on-stand power, taxiing, and take-off. The objective of this research work was to identify the possible ways of air pollution due to aircraft emissions and developed a nano technological solution to reduce aircraft emission. Aviation fuels are obtained from the refining of crude oil and it consist mainly with hydrocarbons. When the combustion efficiency is incomplete in aero engines several other combustion products are also generated such as carbon monoxide (CO), volatile organic compounds (VOCs), and particulates. These toxic gases contribute to climate change specifically to deplete the ozone layer and it gives bad health issues. Transparent inorganic nano sol solution was prepared and characterized using X-ray diffraction, Particle size analyzer and FT-IR for the purity. The photocatalytic degradation of VOC gas was determined after incorporating a VOC gas to the nano sol coated samples. The degradation of the VOC gas was analyzed using the UV-VIS spectroscopy. A significant degradation of the VOC gas was observed in the presence of nano sol. Hence, it is recommended to use the nano sol to degrade VOC gases which are accumulating due to aircraft bleed air. This will enhance air quality that we all breath in.

Keywords: Air Quality, Aviation, Bleed Air, Nanotechnology, Sustainable