

### **S3.3.1 SIMULTANEOUS REMOVAL OF PM<sub>2.5</sub> AND GAS POLLUTANTS BY HVAC FILTER SYSTEM AND INDOOR AIR PURIFIER**

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Due to dramatic economic growth and rapid urbanization, people are moving into new built high-rise apartments and office employees are being relocated in commercial high buildings. However, it has been widely reported that volatile organic compounds (VOCs) with high concentrations were observed in the indoor environment of these new buildings, which were released mainly from new furnishings, glues, paints, etc. The VOCs have shown a strong correlation with lung cancer. Furthermore, it has been proved that VOCs can accelerate the formation of haze pollution in outdoors through a series of heterogeneous reactions. Hence, how to degrade VOCs effectively has drawn more and more attentions. In addition to VOCs, China and other Asian countries are frequently exposed to high PM<sub>2.5</sub> pollution also due to dramatic economic growth. To efficiently mitigate the negative health effects caused by PM<sub>2.5</sub>, especially for those in the smaller size fractions, the reduction of exposure to PM<sub>2.5</sub> is very urgent and crucial. Filtration is widely applied in indoor environments, e.g. schools, commercial and hospital buildings and residential homes, to mitigate the particles which infiltrate into or are originated indoors. In commercial buildings, filters are typically installed in the supply airstreams of heating, ventilating and air conditioning (HVAC) systems that provide heated or cooled air to indoor spaces. In US and China, this supply airstream is usually a mixture of outdoor air and recirculated indoor air, while in many European commercial buildings the airstream is often entirely from outdoor air. Therefore, the performance of the filter is very important in areas with high ambient PM<sub>2.5</sub> concentrations, e.g. China and India, because there is a large portion of outdoor make-up air brought indoors. It is very important to simultaneously remove PM<sub>2.5</sub> and VOCs for indoor environment by HVAC and IAC system. This study will propose a combined filter and photocatalyst module to mitigate both PM<sub>2.5</sub> and VOCs effectively.