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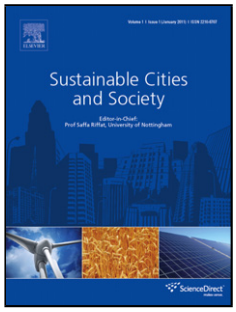

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A review of air filtration technologies for sustainable and healthy building ventilation

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Highlights

- Synergistic effect was identified from fundamental to application.
- Air filtration technologies were evaluated from different aspects.
- Critical factors of air filtration technologies were fully discussed.
- Potential research direction and recommendation for air filtration were proposed.

Abstract

Urbanization increased population density in cities and consequently leads to severe indoor air pollution. As a result of these trends, the issue of sustainable and healthy indoor environment has received increasing attention. Various air filtration techniques have been adopted to optimize indoor air quality. Air filtration technique can remove air pollutants and effectively alleviate the deterioration of indoor air quality. This paper presents a comprehensive review on the synergistic effect of different air purification technologies, air filtration theory, materials and standards. It evaluated different air filtration technologies by considering factors such as air quality improvement, filtering performance, energy and economic behaviour, thermal comfort and acoustic impact. Current research development of air filtration technologies along with their advantages, limitations and challenges are discussed. This paper aims to drive the future of air filtration technology research and development in achieving sustainable and healthy building ventilation.

Keywords: Air Filtration; Standard; Synergistic Effect; Building; Environment; Ventilationn

1. Introduction

Salthammer (2004) reported that a large amount of household products, including furnishings and building materials, discharged VOCs (volatile organic compounds) during their lifetime. Materials for interior decorations are shown to be the sources of reactive compounds, which could lead to indoor air pollution. This problem becomes dominant when different materials react with each other (Singer et al., 2006). Some terpenoids and related compounds of many indoor air fresheners and cleaning products would volatilize during their usage period, which may form secondary pollutants when reacting with

† *Joint First Authorship: The authors wish it to be known that, in our opinion, the first two authors should be regarded as joint First Authors.*