Direct Study of the Particle Differential Mobility Analyzer (DMA) Systems: a review article

Fatemeh Fasih-Ramandi¹, Mohammad Javad Jafari², Asghar Sadighzadeh³, Soheila Khodakarim⁴

1. Student Research Committee, Department of Occupational Health Engineering, School of Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Department of Occupational Health Engineering, School of Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3. Nuclear Science and Technology Research Institute, Atomic Energy Organization of Iran, Tehran, Iran
4. Department of Epidemiology, Department of Occupational Health Engineering, School of Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding author: asadigzadeh@aeoi.org.ir

Abstract

Background & Aim: One of the unknown equipment inside our country, especially for researchers, is the DMA system, which used to particle size distribution, especially for nanoparticles. The purpose of this paper was to review the studies carried out in this field, assessment of the evolution and importance of the application of this system and introduce the true position of this system among researchers in the field.

Methods: In this study, by searching in the databases including, Google Scholar, ProQuest, Science Direct and PubMed, with selecting keywords such as DMA, Electrical Mobility and Particle Counters, 16 studies were examined, from 1950 to 2018.

Results: According to the results, the main advantages of DMA systems include their high ability to measure and classify a wide range of particles with a diameter of 1 to 1000 nanometer, quick response time, high-resolution particle size measurement, minimum sample loss and low cost of design and development.

Conclusion: Differential mobility analyzer system is a powerful tool in the measurement and determine the particle size distribution based on their electrical mobility. So this system can be widely used in industrial and research areas.