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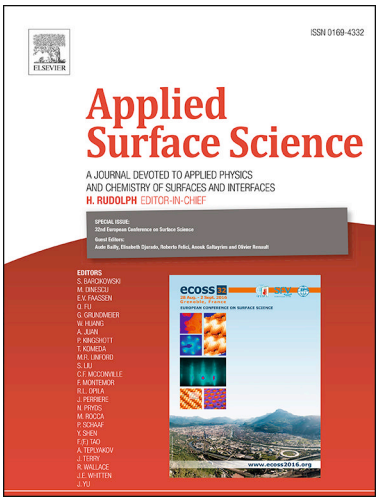

Full Length Article

Atmosphere self-cleaning under humidity conditions and influence of the snow-flakes and artificial light interaction for water dissociation simulated by the means of COMSOL

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Atmosphere self-cleaning under humidity conditions and influence of the snowflakes and artificial light interaction for water dissociation simulated by the means of COMSOL

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Abstract

The self-cleaning of the atmosphere under humidity conditions is observed due to the change in emission intensity when chemical traces are investigated with DARLIOES - the advanced LIDAR based on space- and time-resolved RAMAN and breakdown spectroscopy in conditions of consistent humidity of atmosphere. The determination was performed during the night, in the wintertime under conditions of high humidity and snowfall, in urban area of Iasi. The change in chemical composition of the atmosphere detected was assumed to different chemical reactions involving presence of the water. Water dissociation that was registered during spectral measurements is explained by a simulation of the interaction between artificial light and snowflakes – virtually designed in a spherical geometry - in a wet air environment, using COMSOL Multiphysics software. The aim of the study is to explain the decrease or elimination of some of the toxic trace chemical compounds in the process of self-cleaning in other conditions than the sun light interaction for further finding application for air cleaning under artificial conditions.

1. Introduction

The study of the chemistry and dynamic of the aerosols in the atmosphere is subject to continuous research due to its major impact on human health.