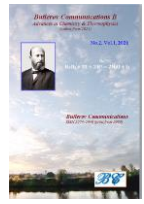
Butlerov Communications B
Advances in Chemistry & Thermophysics
ISSN 2074-0948 (print)

2021. Vol.1, No.2, Id.19.
Journal Homepage: https://b-journal.butlerov.com/

BUTLEROV HERITAGE



Thematic section: Research into New Technologies.
Subsection: Technology of the Inorganic Substances.

Full Paper

The Reference Object Identifier – ROI-jbc-B/21-1-2-19
The Digital Object Identifier – DOI: 10.37952/ROI-jbc-B/21-1-2-19
Received 18 August 2021; Accepted 21 August 2021

The study of the qualitative functions of hybrid powder AgI-SiO_2 material as a new ice-forming reagent

Anastasia S. Averkina,[+] **Viktor A. Valtsifer**,*
Natalya B. Kondrashova,[3] and **Igor V. Vatsifer**
"*Institute of Technical Chemistry of UB RAS"– Affiliation of Perm Federal Research Centre of Ural Branch of Russian Academy of Sciences. Academician Korolev St., 3. Perm, 6140133. Russia. Phone: +7 (342) 237-82-81, +7 (342) 237-82-50, +7 (342) 237-82-80, +7 (342) 237-82-90. E-mail: Anastasiya.Av11@yandex.ru*

*Supervising author; [+]Corresponding author

Keywords: hybrid powders, ice-forming nuclei, activator, reagents, silver iodide, mesoporous silicon dioxide.

Abstract

Low rain clouds and fog can have a negative impact on human activities. At the moment, there is a significant need for the development of new reagents for artificial climate control technologies in order to prevent negative consequences from natural adverse atmospheric phenomena.

Hybrid powder materials (HPM) based on mesoporous silicon dioxide (MCM-41) doped with silver iodide were obtained in the process of template hydrothermal synthesis by the co-condensation method.

The effect of the concentration of the active substance (silver iodide) in the HMP on the textural, structural and morphological properties of the AgI-SiO_2 systems was studied.

The method of X-ray phase analysis (XPA) in the small-angle range has shown that practically in all the considered samples of AgI-SiO_2, an organized pore structure corresponding to the silica matrix MCM-41 is determined.

According to the results of XRD, the ratio of the components of the synthesis [Ag]/[Si] ≤ 0.045 was established, making it possible to obtain HPM samples, in which silver iodide is determined in the form of target crystal structures – iodargyrite (Iodargyrite, β-AgI).

It was shown by the method of low-temperature nitrogen sorption that the AgI-SiO2 samples obtained in the process of template co-condensation under hydrothermal conditions have a high specific surface area – 925-346 m^2/g.

New powder materials can be promising reagents for the fight against fog and low cloudsб due to their multifunctional nature: an inert matrix capable of active moisture absorption, and a crystalline modifier that identifies phase transitions "liquid water – solid ice crystal".

For citation: Anastasia S. Averkina, Viktor A. Valtsifer, Natalya B. Kondrashova, Igor V. Vatsifer. The study of the qualitative functions of hybrid powder AgI-SiO_2 material as a new ice-forming reagent. *Butlerov Communications B.* **2021**. Vol.1. No.2. Id.19. DOI: 10.37952/ROI-jbc-B/21-1-2-19

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