



## **Title: Changing diameters of drops of atomized liquid for pneumatic nebulization**

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Atomization of liquid is widely used in industry (including aerosol therapy, spray drying, powder and emulsion production and agrotechnical treatment). In the recent years, a high interest in aerosol therapy has been noted. This type of therapy has a series of advantages such as: an easy, convenient and quick drug administration, low invasiveness, ability to choose an individual type and dose of medication. It is worth to note that a higher interest in inhalation techniques may be due to the fact that nowadays, the respiratory diseases are one of the most frequent and fast developing in the world affecting whole population in a wide age range. In aerosol therapy and effective delivery of drugs to specific respiratory tract regions a key role is played by a size of drops. It is due to the fact that the drops with greatest diameters ( $> 5 \mu\text{m}$ ) mostly deposit in the upper respiratory tract while drops with diameters of  $\leq 5 \mu\text{m}$  deposit in the lower respiratory tract. The existing research often concerns the method of improving the efficiency of atomization process by affecting the diameters of drops and drops size distribution curves. As part of the research, an attempt was made to modify the pneumatic nebulizer in order to improve the atomization process as a result of smaller drops. For this purpose, the influence of the temperature of nebulized liquid with a use of additional aeration of liquid residing in a nebulizer cup, exerted on drops size histogram and size of drops were analyzed. The tests conducted showed that the proposed modification of the pneumatic nebulizer contributed to disappearance of drops with relatively large diameters, formation of more drops with smaller sizes and the distribution of drop sizes was more uniform.

### **Biography**

Magdalena Matuszak was born in 1988. In 2016, she graduated from Poznan University of Technology, Faculty of Chemical Technology, Institute of Chemical Technology and Engineering and obtained Ph.D. degree. In October 2016 she started to work at Poznan University of Technology, Department of Chemical Engineering and Equipment as assistant. She research interests include chemical and process engineering, especially: multiphase systems, atomization process, and computer analysis of images. She carry out research, which are concerned with the analysis of the atomization process in medical devices. She has published more than 9 papers in JCR journals. Her hobbies are reading and travel.

Marek Ochowiak received a Ph.D. degree in chemical technology from Poznan University of Technology. Since 2002 works in Institute of Chemical Technology and Engineering, Faculty of Chemical Technology, Poznan University of Technology. Obtained Dr. Eng. Habil. degree in chemical engineering from Silesian University of Technology (2014). Since 2016 he is the head of Department of Chemical Engineering and Equipment. Associate Professor Ochowiak's research interests include chemical and process engineering, mechanics, automatics, especially: multiphase systems, atomization process, separation processes, and computer analysis of images. He has published more than 28 papers in JCR journals. His hobbies are photography, reading and travel.

Sylwia Włodarczak was born in 1988. In 2016, she graduated from Poznan University of Technology, Faculty of Chemical Technology, Institute of Chemical Technology and Engineering and obtained Ph.D. degree. In October 2016 she started to work at Poznan University of Technology, Department of Chemical Engineering and Equipment as assistant. She research interests include chemical and process engineering, especially: design of chemical apparatus, atomization process, and computer analysis of images She carry out research, which are concerned with the analysis of the atomization process in atomizers of different construction. She has published more than 6 papers in JCR journals. Her hobbies are reading, music and film.

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Session name/ number:

Category: (Oral presentation/ Poster presentation)