

Increasing of wettability of silk powder using the atmospheric pressure plasma jet treatment

Wednesday, May 20, 2015 2:00 PM (3h 30m)

In this research, the surface of sericin silk powder was treated using the atmospheric pressure plasma jet (APPJ). The plasma was generated with the argon and oxygen flow rate of 1.6 slm and 0.02 slm respectively. The stable discharge occurs with the RF frequency of 76.7 kHz, the plasma current of 140 mA and the RF power of 5.31 W. The silk powder before treated has the initial water contact angle of 75.7° and the absorption time of 29 s. Although the initial water contact angle decrease a little bit to 60°-70° after 45 s of treatment but the absorption time also clearly decreased to 5-7 s. This result shows that the plasma exposure can increase the surface free energy and also increase the hydrophilic property of silk powder. Moreover we found that the absorption time of silk powder has no change after exposure in the ambient air. This indicates that the active radicals from the plasma can be adhered tightly on the silk surface. Result from the SEM image of silk powder before and after treated shows that the silk powder looks like fiber with the diameter of 6-8 μm and does not be destroyed with the plasma beam. This plasma jet can be useful for the treatment of the objects having various structures and also could be applied in the cosmetic industries.

Primary author: Ms SEEHABURAN, Sakuntala (Department of Physics, Faculty of Science, Maharakham University, Maharakham 44150, Thailand)

Co-authors: Dr CHINGSUNGNOEN, Artit (Department of Physics, Faculty of Science, Maharakham University, Maharakham 44150, Thailand); Dr POOLCHARUANSIN, Phitsanu (Department of Physics, Faculty of Science, Maharakham University, Maharakham 44150, Thailand); Dr SUTHIKHUM, Vallaya (Department of Physics, Faculty of Science, Maharakham University, Maharakham 44150, Thailand)

Presenter: Ms SEEHABURAN, Sakuntala (Department of Physics, Faculty of Science, Maharakham University, Maharakham 44150, Thailand)

Session Classification: Poster-1

Track Classification: Ion and Plasma Physics