An Experimental study on surface treatment of aluminum film for improving the hydrophilicity by using the deep coating method in the aluminum pouch of lithium-ion secondary battery

Sungwoo Bae[1] and Dong Soo Kim[2,3]

[1] *Industrial-University Cooperation Foundation, Hanbat National University, 125, Dongseodaero Yuseong-gu, Daejeon, 305-719, Republic of Korea*

[2] *Department of Creative-Convergence Engineering, Hanbat National University, 125, Dongseodaero Yuseong-gu, Daejeon, 305-719, Republic of Korea*

[3] *TOPnC Co., Ltd., 125, Dongseodaero Yuseong-gu, Daejeon, 305-719. Republic of Korea*

Corresponding author: kds671@hanbat.ac.kr

Keywords: Lithium-ion secondary battery, Aluminum pouch film, Deep coating, Surface treatment

This paper reports an improvement of adhesion between the CPP film and the aluminum film in the lithium-ion secondary battery. The aluminum pouch film for the lithium-ion secondary battery is composed of three or four kinds of film such as (PET film)/Nylon film/Aluminum film/CPP film. These films have their own characteristics, for example the CPP film has a characteristic for preventing the leakage of the electrolyte solution. Fig. 1 shows the structure of aluminum pouch film. In the aluminum pouch film, the core technology is the improvement of adhesion between the CPP film and the aluminum film due to these two films are different surface characteristic. So, for the improving the adhesion between the two films, the surface treatment of the aluminum film is required. Therefore, in this paper, we used deep coating method for the surface treatment of the aluminum film.

For the deep coating, we make and use the polydopamine solution by polymerization of dopamine depend on the temperature and density such as 4℃, 25℃, 50℃ and 0.3g/100ml, 0.5g/100ml, 0.7g/100ml, 1.0g/ml, respectively. The 24 hours after coating, we tried to find a coating characteristic by the contact angle and the surface color. Through the various experiments, we have found the dopamine density of 0.7g/100ml and solution temperature of 50℃.

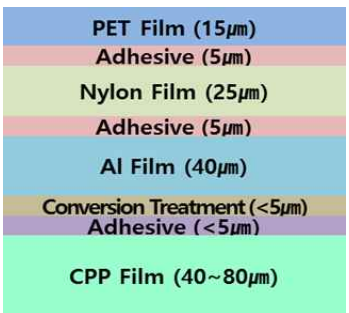
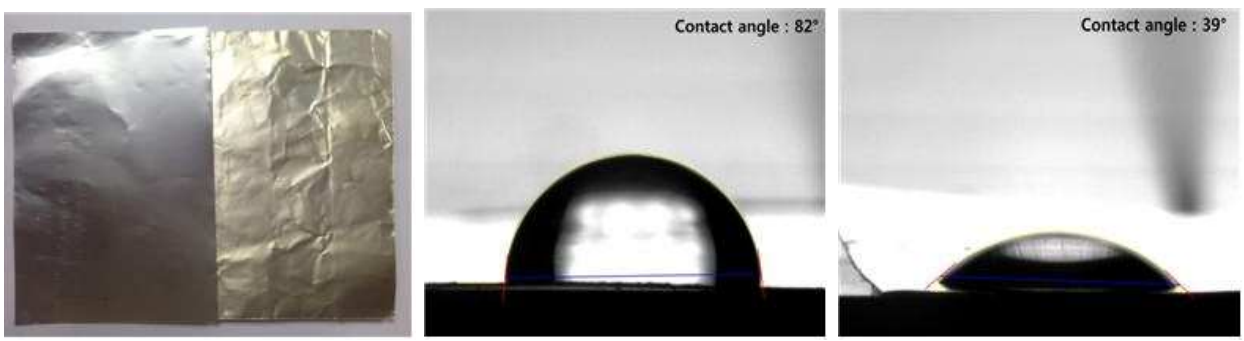


Fig. 1: The structure of aluminum pouch film.

Fig. 2(a) shows the change of color for aluminum film after dopamine coating, color change is visible to the naked eye and Fig. 2(b) shows the different of contact angle coating before and after.



(a) *(b)*

Fig. 2. Compare with coating before and after. (a)surface color, (b)contact angle

This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (MSIP)" (2015, Joint Research Corporations Support Program)