

Transparent electrode based on Self-welding of silver nanowire networks

Baekhoon Seong¹, Ilkyeong Chae¹, Hyungdong Lee¹, Vu Dat Nguyen² and Doyoung Byun¹

¹Dept. of Mechanical Engineering, Sugkyunkwan University, 2066 Seobu-Ro, Jangan-Gu, Suwon, Gyonggi 440-746, Republic of Korea

Tel.: +82-31-299-4846, E-mail: dybyun@skku.edu

²Enjet Inc., 501, Seongshin Techno Park, 323-38 Yeongtong-Ro, Yeongtong-Gu, Suwon, Republic of Korea.

The recent advances in deposition of silver nanowires solution have enabled various macroscopic applications such as transparent conducting electrodes (TCEs) for photovoltaic, touch screen devices for flexible electronics in particular¹. However, high contact resistance between nanowires should demand complicated post processing to obtain the low sheet resistance of thin film. Until now, additional processing steps have been presented to follow the coating process². Here, we present a new spraying method which is so called electric field assisted spray. This method newly developed in this study generates finely charged droplets at high flow rate and induce Joule heating and welding at junctions within the nanowire network without post-processing steps, which is why it is named as the self-welding process. Particularly, the silver nanowire thin film could be uniformly deposited evenly on a large area substrate, and concurrently carry out spontaneous self-welding between the nanowire networks. Fig. 1 shows that the silver nanowires are welded by applying electric field.

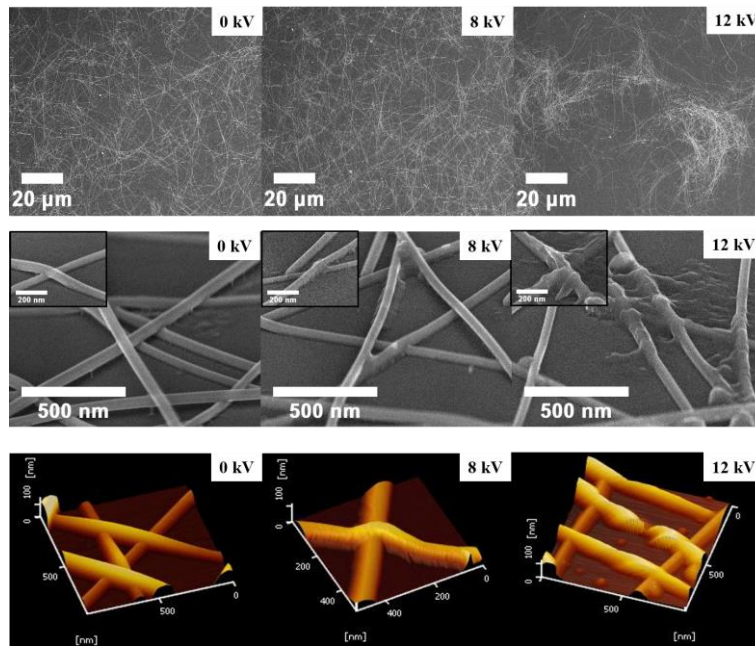


Fig. 1. Field emission scanning electron microscope (FE-SEM) images, atomic force microscopy (AFM) images according to electric field strength

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References

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