

Preliminary Studies on Electrode Ink for Rechargeable Lithium-ion Batteries using 3D Printing Technology

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With the 4th industrial revolution progresses, various types of things have been highly demanded and it has been required to operate the things with suitable energy systems. Batteries have been dominantly using as energy devices but it might be limited to support the various types of things. However, 3D printing can give a possibility to show the various 3D structures by layer-upon-layer and can be used by most kinds of materials such as polymer, metal, ceramic, and so on.

In this study, we have primarily investigated the electrode ink that can be used in 3D printers. By adjusting and optimizing the amount of binder and solvent, the electrode ink with appropriate viscosity has been prepared able to be in stack and we have then investigated to find key factors able to rapidly prepare any complex structure of electrode using the 3D printer with the attempted electrode ink.

In order to investigate the crystallinity and morphology of the prepared electrodes, X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM), etc. have been basically used to characterize and also the electrochemical properties of the ink type electrodes have been compared with those of the traditional slurry type electrode.

References:

[1] K. Fu, Y. Wang, C. Yan, Y. Yao, Y. Chen, J. Dai, S. Lacey, Y. Wang, T. Li, Z. Wang, Y. Xu, L. Hu, Adv. Mat. 28(13) (2016) 2587-2594.