Acknowledgments

This work was supported by a National Research Foundation of Korea (NRF), funded by the Ministry of Education (2015R1D1A1A09058418, 2012R1A6A1029029, and 2013M2A2A9043280). This work was also supported by the Industrial Strategic technology development program (10076562, Development of fiber reinforced thermoplastic nano-composite via fiber bundle spreading for high quality resin impregnation process and its application to the underbody shield component for protecting battery pack of an electric-vehicle) funded by the Ministry of Trade, industry & Energy (MI, Korea).