Meetings International
SciTechnol

Mika Kawai et al., Expert Opin Environ Biol 2018, Volume: 7
DOI: 10.4172/2325-9655-C5-033

World Congress on
BIOPOLYMERS AND BIOPLASTICS
&
World Congress and Expo on
RECYCLING

August 29 -30, 2018
Berlin, Germany

Electric and dielectric properties for bioplastic films

Mika Kawai[1, 3], Tatsuo Kaneko[2, 3], Tetsu Mitsumata[1, 3]
[1]Niigata University, Japan
[2]Japan Advanced Institute of Science and Technology, Japan
[3]Japan Science and Technology Agency, Japan

The development of biobased polymers is indispensable for the establishment of a sustainable low-carbon society. A number of aliphatic biobased polymers such as polyesters; poly(lactic acid), poly(hydroxyalkanote)s, and poly(butylenes succinate), and polyamides (polyamide 11 and polyamide 66) have been developed, but their low glass transition temperature, Tg, and only a small percentage of their substitutes limited their use for various applications as superengineering plastic. We have developed so far biobased PIs from bioavailable aromatic diamines, which were photodimers of 4-aminocinnamic acid (4ACA) derived from genetically manipulated Escherichia coli. These biobased PI films showed ultrahigh thermal resistance with the temperature at 10% of mass loss, T10, values over 425 °C and no Tg values under 350 °C, which is the highest value of all biobased plastics reported thus far. This advanced thermal property can be useful for electric devices such as flexible polymeric electrodes that can be annealed at high temperature. On the application for electric devices, the electric properties such as resistivity, dielectric constant or dielectric breakdown voltage are very important. However, the electric properties for these films are not fully understood. In this paper, we prepared biobased PI copolymer films (ATA/CBDA) of 4,4'-diamino-α-truxillic acid (4ATA) and 1,2,3,4-tetracarboxycyclobutane dianhydride (CBDA) and measured the electric resistance (volume resistivity) and dielectric constant for these films. We discuss the relationship between the electric properties and the molecular structure for biobased PIs. We also succeeded to synthesis water soluble BPI with various counterions. The electric properties for the water soluble BPIs are also presented.

Biography

Mika Kawai has studied polymer science at laboratory of soft and wet matter by Profs. Y. Osada and J. P. Gong in Hokkaido University. She works currently at the Graduate School of Science and Technology, Niigata University as a researcher since 2014. She has published more than 25 scientific papers dedicated to soft materials, especially polysaccharides and biopolymers.

tetsu@eng.niigata-u.ac.jp

Notes: