

## Improving Distributive Mixing of Thermoplastic Starch-Based Blends using Zeolites

**Ranumas Thipmanee<sup>a</sup>, Kanika Yimnak<sup>a</sup>, Porawee Katanyoota<sup>a</sup>, Amporn Sane<sup>a,b</sup>**

<sup>a)</sup> *Department of Packaging and Materials Technology, Kasetsart University*

<sup>b)</sup> *Center for Advanced Studies in Nanotechnology for Chemical, Food and Agricultural Industries, Kasetsart University*

The aim of this work was to explore the effect of zeolites (Z5A and ZSM-5) incorporation sequence on the distributive mixing and mechanical properties of polyethylene/thermoplastic starch (PE/TPS), poly(butylene adipate-co-terephthalate)/thermoplastic starch (PBAT/TPS), polylactic acid/thermoplastic starch (PLA/TPS), and poly(butylene adipate-co-terephthalate)/polylactic acid/thermoplastic starch (PBAT/PLA/TPS) blends. Two processing sequences were used for preparing binary and ternary blend composites: (i) melt compounding of PE, PBAT, PLA, or PBAT/PLA with zeolites prior to melt blending with TPS (SI); and (ii) TPS was melt compounded with zeolites prior to blending with PE, PBAT, PLA, or PBAT/PLA (SII). Distributive mixing and mechanical properties of TPS-based blends prepared by extrusion process were greatly enhanced when zeolite was incorporated via suitable compounding sequence. The microstructures as well as rheological and thermal properties of TPS-based blends were investigated via scanning electron microscopy, X-ray diffraction, and rheological measurement.

Corresponding author: [fajiams@ku.ac.th](mailto:fajiams@ku.ac.th)

### Author Biography:

Name: Amporn Sane

University/Institute: Kasetsart University

Research Interest: Plastic manufacturing processes, Food contact materials,  
Functional coating, Encapsulation of active compounds

Current position:

Feb 2017-Current      Department Head of Packaging and Materials Technology  
Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand

Education:

2000–2005      Ph.D. in Chemical Engineering, Clemson University, USA

1997–1999      M.Sc. in Chemical Engineering, University of South Carolina, USA

1991–1995      B.Sc. in Food Science and Technology (Honors), Kasetsart University, Thailand

