

Arjaree Pradittham 2014: Mechanical Properties and Crystallization Behavior of PP Film/ $\text{CaCO}_3$  Modified by Fatty Acid for Microwaveable Packaging of Chilled Food. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging and Materials Technology. Thesis Advisor: Assistant Professor Chiravoot Pechyen, Ph.D. 122 pages.

Effect of fatty acid type and content on modified calcium carbonate ( $\text{CaCO}_3$ ) of polypropylene (PP) film for microwave application were studied in this research. Two types of fatty acid were used; palmitic acid and stearic acid at 1, 3 and 5 %wt. The results showed that optimum concentration of both fatty acid attached to  $\text{CaCO}_3$  surface was 5 %wt. After that the  $\text{CaCO}_3$  was mixed with PP which particle content varying from 0.5, 1.0 and 1.5 phr for forming a film. Incorporation of modified  $\text{CaCO}_3$  1.0 phr (both palmitic acid and stearic acid) into PP film showed good morphological properties. Besides, films also presented high tensile strength (21.24 MPa and 22.90 MPa, respectively) and modulus (1238.13 MPa and 1137.32 MPa, respectively). Moreover, films displayed suitable crystallization behavior and thermal properties for usability in microwave oven. For microwave application testing, films were heated in microwave oven at 340, 650 and 1300 watt for 10 minutes. It was revealed that the addition of modified  $\text{CaCO}_3$  (both palmitic acid and stearic acid) improved crystallinity resulting in increase of mechanical properties, barrier properties and melting temperature. In contrast, glass transition temperature decreased. For increasing of electric power (650 and 1300 watt), it was indicated that properties of films tend to decrease. Although, the properties of films decreased after microwave heating, properties of films still better than non-heated films. The properties of PP/ $\text{CaCO}_3$  modified by palmitic acid was better than the use of stearic acid.

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Thesis Advisor's signature