ANALYSIS OF SPRAYABLE POLYDIMETHYL SILOXANE THERMAL INSULATION FOR HIGH TEMPERATURE APPLICATIONS

By

Eng. / Tarek Mohamed Fouad Asawy Abd El-Ghafar

A Thesis Submitted to the
Chemical Engineering Department
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirement for the Degree of
DOCTOR OF PHILOSOPHY
In
CHEMICAL ENGINEERING

FACULTY OF ENGINEERING
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Key Words:(sprayable coating, Mechanical Fillers, thermal Fillers, Degradation Kinetics, Heat transfer)

Summary:
In recent years, there has been a large increase in employing polymers in engineering applications. Modified Polysiloxanes are generally recognized as the newest generic class of high performance protective sprayable coating. For this reason, understanding the mechanical, thermal and flammable properties of blended PDMS under high temperature and different loading rates has become important to study. In this thesis, storage modulus, loss modulus and stiffness, Tan Delta, thermal degradation at different heating rates (5, 10,15and 20°C/min) have been measured, kinetics of thermal degradation, thermal conductivity, heat capacity, thermal expansion ratio, flammable properties and mathematical heat transfer models programs for PDMS mixtures samples were thoroughly investigated by using several techniques (DMA, TGA, TMA, DSC, LOI%-UL94V, SEM, Pull-Off Test, MATLAB, FORTRAN).

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