INTUMESCENT COATING

SCIENTIFIC EVIDENCE OF EFFECTIVE HALOGEN-FREE FIREPROOFING COATING

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Penerbit
Universiti Malaysia Pahang
Kuantan
2023

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UNIVERSITI MALAYSIA PAHANG
PENERBIT

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First Published, June 2023

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Cataloguing-in-Publication Data
Perpustakaan Negara Malaysia
A catalogue record for this book is available from the National Library of Malaysia
ISBN 978-967-2831-88-4

Director Penerbit : Dr. Mel
Editor : A. R. Aria
Proofreader : A. R. Aria & D. Aziz
Graphic Designer : R. W. Chamie
Administration : A. Azianti & N. A. Aryan
Sales & Marketing : N. H.

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Online Shop: https://msha.ke/penerbitump
Official Page (FB) : Penerbit Universiti Malaysia Pahang
Official IG : Penerbitump

Published By
Penerbit
Universiti Malaysia Pahang
Lebuh Persiaran Tun Khalil Yaakob,
26300 Gambang, Kuantan,
Pahang Darul Makmur.
Tel: 09-549 3273 Fax: 09-549 3281

Printing
Jasamax Enterprise (JM0300878-A)
No 55, Jalan Kebudayaan 2, Taman Universiti,
81300 Skudai, Johor.
Tel: 07-521 2889/7829
E-mail: jsmtmu@gmail.com

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LIST OF ABBREVIATIONS

APP	ammonium polyphosphates
ATH	aluminum hydroxide
BA	boric acid
CNT	carbon nanotube
CO	carbon monoxide
CO_2	carbon dioxide
DNA	deoxyribonucleic acid
DTG	differential thermal analysis
EG	expandable graphite
EVA	ethylene-vinyl acetate
FR	flame retardant
GO	graphene oxide
H	Hydrogen
HBr	hydrogen bromide
HCl	hydrogen chloride
HF	hydrogen fluoride
HFFR	halogen-free flame retardant
HNT	Halloysite
HRR	heat release rate
LDH	layer double hydroxide
LOI	limiting oxygen index
MDH	magnesium dihydroxide
MEL	Melamine
MH	magnesium hydroxide
MMT	montmorillonite
MWCNT	multiwall carbon nanotubes
N_2	nitrogen gas
NH_3	Ammonia
OH	Hydroxyl
OH	hydrogen monoxide
P_2O_5	phosphorus pentoxide

PA6	polyamide-6
PA66	polyamide-66
PC	Polycarbonate
PDMS	polydimethylsiloxane
PER	pentaerythritol
PLA	polylactic acid
PO	phosphorus monoxide
PO_2	phosphorus dioxide
PP	polypropylene
PU	Polyurethane
PVC	polyvinyl chloride
TGA	thermogravimetric analysis

LIST OF SYMBOLS

σ	char yield

PREFACE

Our journey in producing this book has been a long one before this textbook made its way to you. A truly committed team of authors, editors, graphic designers and publishing experts worked together to produce something that has never been done before. This book contains several chapters including the introduction of flame retardant, the classification of flame retardant materials with a brief discussion of halogen-containing flame retardant, nanofiller-containing flame retardant, and inorganic flame retardant. A discussion on the FR mechanism is also devoted to the readership. The comprehensive information about intumescent flame retardant coating and the synergistic effect of nanofillers on flame retardancy properties have been inclusively discussed in this book. The detailed description of the mechanism of intumescent flame retardant as well as its advantages and its disadvantages have been thoroughly deliberated. Emphasis is placed on the recent developments in the field of fire testing and analysis of the fire performance of steel elements protected with intumescent coatings. These are followed by the new study on flame retardancy and thermal stability of hybrid nanofiller's intumescent flame retardant coatings. The hybridisation of the inorganic fillers and their effect on the coating performance are also proven through scientific evidence. The targeted audiences are industrial and academic researchers, industrial chemists, and fire safety engineers from the same field of study. It would also be beneficial for professionals within the materials science and engineering fields.

ACKNOWLEDGEMENT

In the name of Allah the Most Gracious and Most Merciful. Within the salawat and salam to Prophet Muhammad S.A.W. Alhamdulillah. Thanks to Allah S.W.T. the Almighty, for His generous blessing and undying strength bestowed to us to publish this book. Special thanks are extended to Prof. Dr. Azman bin Hassan for their germinal ideas, invaluable guidance, continuous encouragement, and constant support in making this research possible.

We would also like to convey our appreciation to the Ministry of Education (MOE) Malaysia, for funding this research under Fundamental Research Grant Scheme (FRGS) No. FRGS/1/2021/STG05/UMP/03/1 (University reference RDU210108) and Universiti Malaysia Pahang for laboratory facilities, as well as additional financial support under Internal Research Grant RDU200341.

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