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Hot corrosion behaviour of mild steel in chloride compound /
Mohd Nordin Shamsudin.

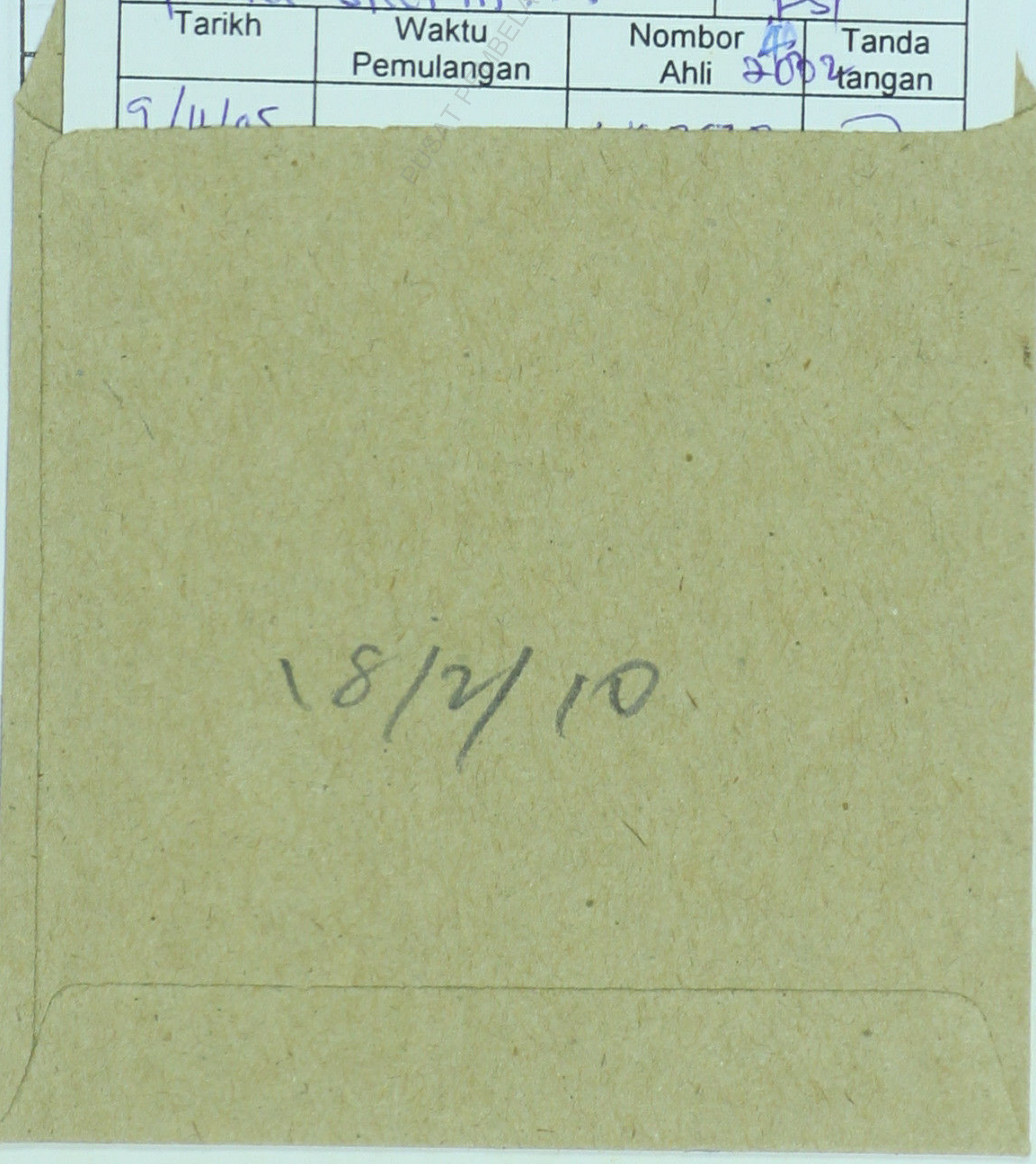
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Pengarang <i>MOHD NORDIN, SHAMSUDIN</i>		No. Panggilan <i>LP 26 FST</i>	
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HAK MILIK
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HOT CORROSION BEHAVIOUR OF MILD STEEL IN CHLORIDE COMPOUND

By

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Thesis submitted in partial fulfilment of the requirement for the Bachelor of
Science (Hons.) in Chemistry

FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY MALAYSIA
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Approved By:

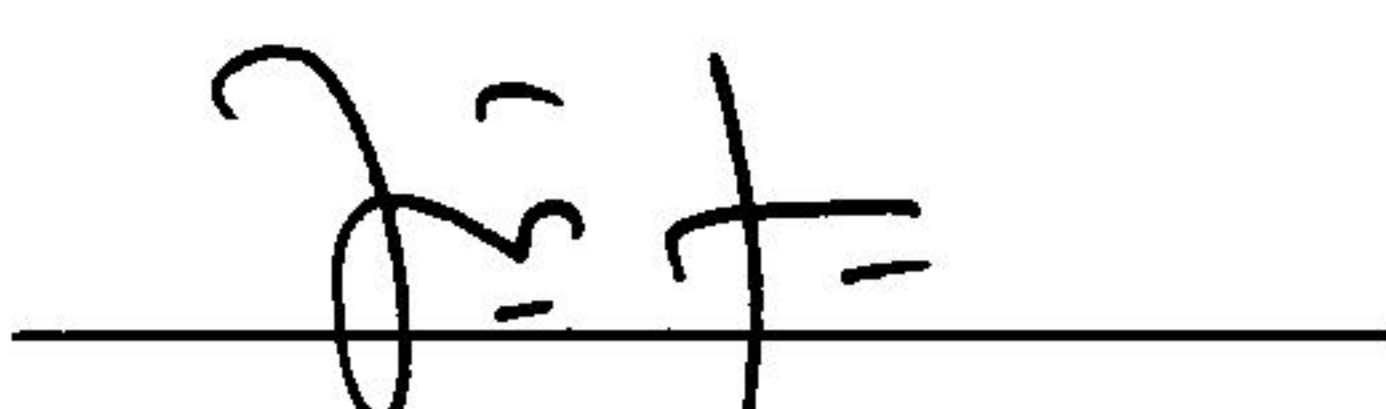
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Date: 1/4/02

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Thank you

Wassalam

MOHD. NORDIN BIN SAMSUDIN

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ABSTRACT

Thermogravimetric studies have been conducted on the oxidation of low carbon steel or mild steel at 400⁰C, 500⁰C, 600⁰C and 700⁰C in presence of chloride compound, which we choose here, are sodium chloride, potassium chloride and seawater. The chlorides compound react with the metal under formation of chlorine that enters the scale and causes accelerated oxidation by the formation of FeCl₂ (s) at the metal interface, evaporation of FeCl₂ (g) and its oxidation to Fe₂ O₃ at the scale surface, chlorine partially returning into the scale. This lead to porous unprotective scale and hot corrosion that catalysed by chlorine. The pattern of corrosion rate at 400⁰C, 500⁰C, 600⁰C and 700⁰C is being determined in this study. The pattern shows that the temperature is directly proportional to the corrosion rate. The hot corrosion behaviour of mild steel in presence of sodium chloride, potassium chloride and seawater in 400⁰C, 500⁰C, 600⁰C and 700⁰C is also analysed. Where at different temperature the aggressiveness of this different solution also vary.

ABSTRAK

Kajian Termogravimetrik telah dijalankan terhadap pengoksidaan logam aloi ferum berkarbon rendah (mild steel) pada suhu 400⁰C, 500⁰C, 600⁰C dan 700⁰C dengan kehadiran sebatian klorida yang merujuk kepada natrium klorida, kalium klorida dan air laut. Sebatian klorida bertindak balas dengan logam melalui pembentukan gas klorin yang meresap kedalam lapisan luar oksida logam (scale) dan mempercepatkan proses pengoksidaan dengan pembentukan FeCl₂ pepejal di permukaan logam, pemeuapan gas FeCl₂ dan pengoksidaan gas FeCl₂ kepada Fe₂O₃ pada lapisan luar oksida logam. Terdapat sesetengah daripada klorin ini akan kembali semula ke lapisan tersebut. Proses ini akan membentuk lapisan oksida yang porous dan menyebabkan proses pengaratan pada suhu tinggi yang dimungkinkan oleh klorin. Dalam kajian ini, corak kadar pengaratan pada suhu 400⁰C, 500⁰C, 600⁰C dan 700⁰C telah dapat ditentukan. Daripada penentuan ini diketahui bahawa suhu adalah berkadar terus dengan kadar pengaratan. Perlakuan pengaratan pada suhu tinggi bagi logam aloi ferum berkarbon rendah dengan kehadiran natrium klorida, kalium klorida dan air laut pada suhu 400⁰C, 500⁰C, 600⁰C dan 700⁰C juga dianalisa dalam kajian ini dimana pada suhu yang berlainan keaktifan bagi larutan-larutan ini juga berbeza-beza.