London Branch - News

November 2017 | Joint Meeting with TWI

In Brief:

- James Hesketh of the NPL tells us about the work they have been doing on Pit to Crack testing

Annual Lunch
Thursday 7th December at ROSL in London

The Route to Chartered Status
Program starts in January 2017

The Fundamentals of Corrosion
A program of courses have been arranged starting February 2017

Young Engineer Program (YEP)
The program starts in January with a lecture on The Fundamentals of Corrosion at CB&I in Paddington

Winter Meetings:

November 9th 2017
The role of H2S in pitting of Stainless Steel in Sour Oil and Gas applications
James Hesketh, Gareth Hinds, Alan Turnbull – NPL, Teddington
Skempton Building, Imperial College
18.00 for 18.30 start
(Joint with Welding and Joining – TWI)

Influence of H_2S on the Pit to Crack Transition in Sour Testing of Corrosion Resistant Alloys

James Hesketh – National Physical Laboratory

Stable pitting is a precursor to sulphide stress corrosion cracking (SSCC), which is one of the main causes of failure of stainless steel pipelines used in sour Oil and Gas production. Despite this, the underlying mechanism governing the growth of such pits is poorly understood, and hence materials selection for sour service is dependent upon costly and time consuming environmental exposure and SSCC test programmes.

In this study we investigate the role of hydrogen sulphide (H_2S) in pit propagation as a first step towards the development of accelerated test methods for SSCC resistance. Novel electrochemical techniques are employed to determine the relationship between bulk solution chemistry and the critical pit chemistry required to induce stable pitting in sour environments.

Electrochemical measurements are correlated with results obtained from standard SSCC tests and are rationalised in terms of the balance between H_2S diffusion through the pit mouth, H_2S consumption within the pit and the role of the external cathode.

The implications for more informed and cost-effective materials selection are discussed.

James Hesketh received a vote of thanks from Stephen Shapcott on an excellent presentation and received gifts from both TWI and ICorr.

December 7th 2017
Annual Lunch
Royal Overseas League, London
12.00 for 13.00 Lunch

January 11th 2018
Skempton Building, Imperial College
18.00 for 18.30 start

February 8th 2018
Skempton Building, Imperial College
18.00 for 18.30 start

March 8th 2018
Skempton Building, Imperial College
18.00 for 18.30 start

April 12th 2018
Skempton Building, Imperial College
18.00 for 18.30 start

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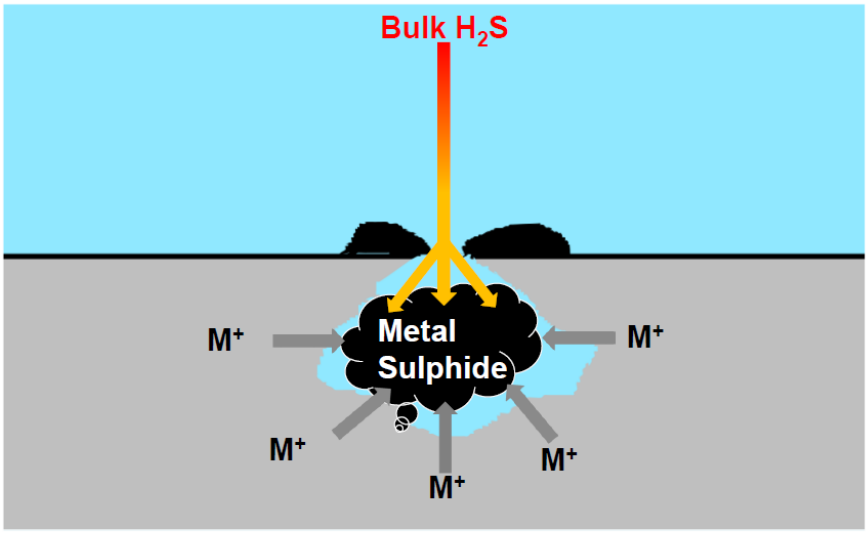
The Institute of Corrosion Website
www.icor.org

It was demonstrated that there was a systematic decrease in pit size with increasing H2S concentration. Also that a greater peak current was measured at higher H2S concentrations and repassivation was slower.

Suggested explanation for diminished pit depth at elevated H_2S concentrations



- Pit may become blocked with metal sulphide quicker at higher concentrations of H_2S

National Measurement System

Acknowledgements

Co - authors

Gareth Hinds
Alan Turnbull
Phil Cooling

Industrial Advisory Group

bp, Shell, itf, ConocoPhillips, TOTAL, KBR, JM, MAERSK OIL, CBI, TATA STEEL, National Measurement System, GE, Chevron, BG GROUP

UK Government

National Measurement System