

ESDU-SPA-M10-1

Apr.09: Fouling chemistry



Unamended
Issued October 2010

Imperial College
London

AWA
Documents
Document Sharing Hub

Fouling chemistry

Silvia Venditti

Supervisors: M. Millan-Agorio, R. Kandiyoti

Energy Engineering

Department of Chemical Engineering
Imperial College London

Contents



- General information about my work
- MBR runs
- Characterisation of heat exchanger deposits
- Conclusions
- Future work



Documents
Document Sharing Hub

Imperial College
London

Motivations and Objectives



- Petroleum fouling in pre-heat trains is mainly due to thermo-chemical reactions and nature of the feed material.

Effect of temperature-time history on the composition of feed and deposits.

- There is a lack of standardised procedures suitable to characterise the heat exchanger deposits.

Provide a method to identify the chemical composition of an unknown refinery solid foulant deposit.



Approach



■ PART ONE

Use of a static micro-bomb reactor (MBR) in lab scale to simulate fouling process.

■ PART TWO

Use of a set of analytical techniques to characterise heat exchanger deposits. A fractionation is needed for a better identification of foulant components.



Part One

Imperial College
London



Documents
Document Sharing Hub

Micro-bomb reactor (MBR) 1/3

Lab operating conditions

Nitrogen blanketing to avoid autoxidation

Elevated pressure to avoid complications of boiling on heat transfer surface

Assumptions

1. Absence of flow stress
2. Uniform temperature profile

