



Hydroprocessing of heavy oils and residua

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Book Review

Hydroprocessing of heavy oils and residua

J. Ancheyta and J. G. Speight

CRC Press, Taylor and Francis Group, 2007, 345 pages, £97

The basic reason for attempting this book is succinctly summarised in the introductory paragraph of Chapter 6 (p. 121).

'The development and use of technologies for hydroprocessing of heavy oils has been slow because of the availability of light sweet crudes...the small price differential between light and heavy oils has oriented refiners to the use of ... Refining companies have been under pressure to achieve a short payback period ...funds have been used... in the upstream processing of oil. *However, the world's reserves of sweet crude oil resources are expected to decline.*' (Reviewer's italics)

Indeed if Matt Simmons ('Twilight in the desert', 161; 2005, Hoboken, NJ, John Wiley) is proved right and the main Saudi oilfields producing most of the Kingdom's oil [notably Ghawar and Abqaiq (of 'Arab Light' fame)] begin to decline, the rush to develop technologies for refining and upgrading heavier oils will need to accelerate. Another obvious need for processing heavy cuts arises from the present high price of oil, combined with over a century of wasting the bottom of the barrel as bunker fuel and petroleum coke. Most present day refineries are simply not equipped with rational solutions to utilising heavy crude oils and their residues.

At first glance, this is a book that might appear as superficial. On more careful examination, however, it certainly grew on this particular reviewer. The editors have done an excellent job in providing the background for, and outlining the main lines of attack in 'Hydroprocessing of heavy oils and residua'. The careful reader would come away with a strong background on existing technology. The articles have been written by seasoned (I would go so far as to say cultured) authors who have crafted a book short on specific recipes but strong on general contours of a complicated field where much work has already been carried out – the authors have been generous in providing references – but much more research as well as development is required. This is not

a 'How to...' book but a good overview of a field that is likely to gain in importance. This is probably an essential read for helping plan research and design activity, and extremely useful in positioning one's future work in what is a broad field comprising diverse areas of specialisation.

The book opens with a good common sense introduction for those new to the field, followed by descriptions and evaluations of standard characterisation methods and some sound hydroprocessing chemistry. The specialist chapters include one on some very readable thermodynamics of hydroprocessing followed by 'Reactors for hydroprocessing' largely descriptive and useful for its summary of current practice. Like the rest of this compact volume, there is no attempt to teach – reactor design in this case – but to provide a good outline of what is presently out there. On careful reading, this chapter makes sense to specialists who already have notions about how to design reactors. Three detailed chapters on hydroprocessing catalysts place this key area in the heart of the book. The level of detail provided in these chapters seemed well selected. It seemed apt to devote a chapter for discussing the effect of changing feedstock compositions on the performance of hydroprocessing catalysts. The book concludes with several competently written chapters on applications and – how could we do without it – a chapter on hydrogen production.

This is a book about the 'today' of a field where breakthroughs seem needed along several parallel avenues. I think I would have wished to see more discussion of potentially fruitful avenues for research and development and perhaps an, albeit short, debate about what else is there that we need to know about and indeed, how to approach what we do not know. This seemed to be the one minor weakness of an otherwise accomplished, useful and well designed book.

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