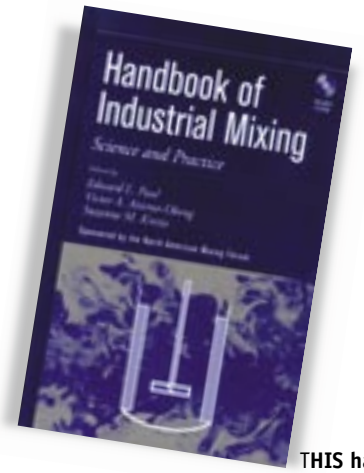

Handbook of industrial mixing

Edward Paul, Victor Ateimo-Obeng and Suzanne Kresta, Wiley Interscience, Hardback, 1377pp, £100, ISBN 0-471-26919-0

THIS handbook puts 'everything about mixing' in a single secure easily-recoverable place. No more rooting through your files to find that elusive bit of vital information you thought you had somewhere. Hence this is a practical 'must have' for anyone who encounters mixing equipment in their work (this will apply to almost everyone, whatever sector of the process industries they are in). It is truly the 'Perry' of mixing and if what you are looking for isn't there, it probably doesn't yet exist. That being said, it still needs to be emphasised that mixing as a subject presents probably the greatest intractabilities in process engineering.

Therefore the Handbook won't necessarily provide the simple answers, advice and rules you wish you had, although conversely it could indicate where research effort is needed.

In terms of economics, it is estimated that losses due to poor mixing in just the chemical industry amount to $10b per year. This does not include unknown costs of 'lost opportunities', when inappropriate mixing in the lab gives zero yield of a prospective chemical product. Hence at 1300 hefty pages and some 43 mostly very well-known author specialists, the handbook is well placed to help to counter this waste of resources.

The handbook has come into being through the efforts of the North American Mixing Forum (NAMF). They are to be thoroughly congratulated. NAMF (within AIChE) has existed for some forty years, in one guise or another, and its biennial conferences formed a platform where industrialists with mixing problems met with academic researchers. From these regular gatherings the handbook was conceived.

The twenty-two chapters are formed into three themes: fundamentals; systems characterised by physico-chemical properties and number of phases; and industrial sectors. In almost every case the chapters are authored jointly by an industrialist and an academic, ensuring that theory and practice are equally considered and effectively balanced together. Whilst the usual subjects such as turbulence, blending, mixing with reaction etc are well covered, there are some fresh angles. There are some useful-looking diagnostic charts for self-assessment of mixing problems by a non-expert. Also, the two chapters on experimental techniques for mixing characterisation and computational fluid dynamics (CFD) both bring a generic element that should be useful. The industry sector chapters 17–20 cover fine chemicals/pharmaceuticals, fermentation/cell culture, petroleum and (distinctively) the pulp and paper industry, where the solid fibre phase can confer strange rheology. There is even a final chapter giving the equipment vendor view. Although the usual 'caveat emptor' should always apply, the vendors have mostly seen it all before, so they know what works.

It's clear that the three editors have done a remarkable job in pulling together such a thorough and well-produced volume. At £100 (in the UK) it must surely be good value when, for instance, in the pharmaceutical industry a single batch from a stirred reactor might itself be worth £1m. There is a CD-ROM provided that contains a large number of video clips visualising mixing phenomena, although this seemed tricky to navigate. In places there is some repetition, although in general the cross-referencing is efficient.

Is anything missing? One might argue that safety might have had a higher profile. Perhaps also, in view of recent FDA strictures in the US, a chapter is needed on instrumentation, since although the handbook makes clear that we need to understand and control the concentration fields inside mixers, there are presently no means of doing this on-line in the factory. The advent of this kind of capability should mean that far fewer people will in future blithely proceed to assume 'perfect mixing'.

A very worthwhile book.

Reviewed by Reg Mann, professor of chemical engineering, UMIST

Recently published

Electrochemical aspects of ionic liquids

Hiroyuki Ohno, John Wiley & Sons £88.50 / €125

FOCUSING on the electrochemistry of ionic liquids, *Electrochemical aspects of ionic liquids* is aimed at professionals. It provides the latest data for engineers and researchers in relevant industries, as well as academic scientists and graduate students.

The book starts with the importance and fundamental properties of ionic liquids, followed by a more general review of electrochemical processes, and finally covers some highly specialized and novel developments such as ionic liquidized DNA.

Solid state transformation and heat treatment

Edited by Roland Würschum, Wiley-VCH £85 / €127.50

IN the highly active research field of nanophase materials, nanocomposites have been identified as main research areas that could lead to novel functional and structural materials. The contributions to this book, based on the Euromat symposium, address novel or advanced properties and functionalities of nanocomposites.

Solvent extraction principles and practice – 2nd edition

Edited by Jan Rydberg, Mike Cox, Claude Musikas, Gregory R. Choppin, Marcel Dekker, £130.00

A COMPLETE and up-to-date presentation of the fundamental theoretical principles and many applications of solvent extraction, this enhanced second edition includes new coverage of the latest developments in solvent extraction processes, the use of solvent extraction in analytical applications and waste recovery, and computational chemistry methods for modelling the solvent extraction of metal ions.

Solid fuels combustion and gasification

Marcio L de Souza-Santos, Marcel Dekker, £110

SUPPLIES an abundance of examples, models, and exercises for step-by-step instruction on the modelling and simulation of combustion and gasification machinery. Bridging the gap between theory and application, this reference demonstrates the operational mechanisms, modelling, and simulation of equipment for the combustion and gasification of solid fuels, clearly illustrating procedures to improve and optimise the design of future units and the operation of existing industrial systems with recommendations and guidelines from a seasoned professional in the field.