tency throughout the book. The book does seem to spend a great deal of time looking at biochemistry issues. Is this really a reflection of ‘New Chemistry’? If some chapters had been thinner, there would have been the opportunity to include some other areas that would class as new. Perhaps green chemistry?

Giving references at the back end of each chapter is a good idea, but why use only 5–10 or so? I suggest that more are used with attention to inclusion of a few milestone papers and more up-to-date references to reinforce the ‘newness’ of the topic. The secondary author of Chapter 1 confesses that the material covered is two years out of date as a result of the primary author passing away. Apparently, the second author did not feel it was appropriate to update the contribution. Personally, speaking as a scientist, I wouldn’t want my contribution to be out-of-date, for any reason, especially as this book hinges on being ‘new’. I recommend that this admission be removed, because it’s potentially irritating to scientists.

Some of the images are of surprisingly low quality, e.g. the periodic table on page 1, and the molecular diagrams on page 36 in ‘Bonding, Atoms and Molecules’. This represents an inconsistency, since parts of the book are extremely well presented.

As first stated, the book is well written and reasonably balanced in terms of complexity of content. I am uncertain as to the target audience; hence its difficult to say whether the book will be well received in that context. The book does an excellent job of showing how the world of chemistry is inextricably linked to every other discipline, materials, mechanics, biosynthesis, medicine, agriculture and manufacturing.

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Non-linear Mass Transfer and Hydrodynamic Stability

Chr. B. Boyadjiev, V.N. Babak, Elsevier Science B.V., 2000, 500 pp., ISBN 0-444-50428-1

Mass transfer lies at the core of so much of what we observe, from transport processes in a large variety of engineering applications (evaporators, heat exchangers, absorbers to name but a few) to convection phenomena in the Earth’s mantle. Yet the mass transfer enthusiast keen to get to grips with this diverse, complex subject rapidly discovers something rather extraordinary; there are a few texts on mass transfer. There are of course simple and heuristic descriptions of mass transfer in most undergraduate books, and some excellent monographs but there is virtually nothing on non-linear mass transfer and its relation to hydrodynamic stability and hence *Non-linear Mass Transfer and Hydrodynamic Stability* by Boyadjiev and Babak is a welcome addition to the existing literature.

The book is essentially a theoretical analysis of non-linear mass transfer and its strength lies in the authors’ determination to keep the discussion at an advanced level. The exposition to the fundamentals of mass transfer is careful and well-suited to those new to the subject. Overall, the treatment is mathematical in style and assumes a reasonable background in classical methods of applied mathematics and transport phenomena.

The brief introduction to the basics of linear mass transfer at the beginning of the text is followed by a series of chapters on non-linear effects. Such non-linear effects and deviations from the linear theory can arise due to intensive mass transfer associated with large concentration gradients of the transferred species — this is the case of concentration dependent molecular diffusivity. Another source of non-linearity is the dependence of viscosity and surface tension on the concentration of the absorbed species. In particular, the variation of surface tension with concentration (the Marangoni effect) can lead to secondary flows at interface boundaries and hence affect the hydrodynamics of the flow. The discussion of these effects is extensive and thoughtful.

The text also covers a large variety of problems usually not included in traditional descriptions of mass transfer. For example, non-linear mass transfer in electrochemical systems with high current density (typical examples include electro-separation of metals) and non-linear mass transfer in chemically reacting systems. (This last case is obviously inherently non-linear due to the non-linearity of the chemical reaction kinetics equations). The thermocapillary Marangoni effect induced by the exothermicity of chemical reactions is also considered in detail. Finally, the book closes with an analysis of the coupling between mass transfer and fluid mechanics in the context of linear hydrodynamic stability theory of nearly parallel flows (such as laminar boundary layers). This last chapter on hydrodynamic stability is very welcome, though the chapter is, perhaps, a little brief especially considering that this is a text on non-linear mass transfer and hydrodynamic stability. In addition, the inclusion of some elements of non-linear dynamics at the beginning of the hydrodynamic stability chapter is also brief and it appears somewhat disconnected from the rest of the text, leaving the reader with the distinct impression that some of the modern non-linear dynamics and bifurcation theory concepts are not utilized in a text devoted to non-linear effects in mass transfer.

My other criticism of the book is that despite the large variety of topics discussed, there are still several important non-linear mass transfer problems which deserve special attention and have not been included here: mass transport enhancement due to Taylor–Aris dispersion, diffusive transport and anomalous diffusion in Rayleigh–Bénard convection cells (and more general transport in systems with closed recirculation zones for small and large Reynolds numbers flows), natural convection and buoyancy effects and finally mass transport due to chaotic advection in time-dependent fluid flow systems.

Despite the reservations listed above, I am enthusiastic about Boyadjiev and Babak's *Non-linear Mass Transfer and Hydrodynamic Stability* and I would strongly recommend it to all researchers and graduate students with an interest in mass transfer.

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