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Book reviews

Catalyzed Direct Reactions of Silicon

K.M. Lewis and D.G. Rethwisch (eds.), Elsevier, Amsterdam, 1993, xvii + 644 pages.

ISBN 0-444-81715-8

The great majority of articles in this volume are concerned with aspects of the Direct Process for production of methylchlorosilanes. The topics are as follows: commercial production of silanes by the direct synthesis; production of silicon for the methyl chloride direct synthesis; quality criteria for silicon used for organo-silicon industry; some considerations of the direct synthesis of methylchlorosilanes; selection of copper formate catalysts for the direct synthesis of methylchlorosilanes; catalyst preparation for the direct synthesis of methylchlorosilanes: practical, theoretical, and reactor design considerations; kinetics of the methyl chloride–silicon direct reaction; gas chromatographic analysis of methylchlorosilanes produced by the direct reaction; gas chromatographic analysis in the manufacture of chlorosilanes; in-line Fourier transform infrared spectroscopic analysis of methylchlorosilanes produced by the direct reaction; copper-catalyzed etching of silicon; model reaction studies of the direct synthesis of methylchlorosilanes; selective formation of dimethylchlorosilanes on Si surfaces; effects of promoters on the catalytic synthesis of methylchlorosilanes; chemisorption and catalytic activity of Cu and Mg atoms on Si(III) surfaces; surface-chemical studies of the mechanism of the direct synthesis of methylchlorosilanes; direct synthesis of chlorosilanes and silane; by-products from waste treatment for a bench scale trichlorosilane/tetrachlorosilane direct process; mathematical modelling of diffusion and microkinetics in direct reactions of silicon and in the processing of electronic components; copper-catalyzed reaction of dimethylamine with silicon.

I found especially interesting the last of these articles, a fairly detailed account by K.M. Lewis, B.K.C. Tan, T.E. Childress and D. McLeod, of the production of $(\text{Me}_2\text{N})_3\text{SiH}$, along with a large number of related compounds, by reaction of dimethylamine with silicon–copper; this is the first survey of the subject to appear since the process was patented in 1981 by B. Kanner and W.B. Herdle.

The articles are reproduced directly from typescripts of varying quality. There is a reasonable index.

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Phase Transfer Catalysis. Selected Problems and Applications

Y. Goldberg, Gordon and Breach, Switzerland, 1992, xv + 456 pages. USD170; £92; ECU130.

ISBN 2-88124-870-5

Although this book bears a 1992 date the copy for review was received only in late 1993. It is an updated translation of a monograph published in Latvia in 1989.

After a chapter outlining the basic principles of phase-transfer catalysis, the book is concerned with its applications in some specific areas, as indicated by the chapter headings, viz: phase transfer catalysis in the chemistry of nitrogen-containing heterocycles; phase transfer catalysis in organometallic chemistry; metal-complex catalysis under phase-transfer conditions; triphase catalysis; asymmetric phase transfer catalysis; non-typical variants of phase transfer catalysis. A large part of the chapter on phase transfer catalysis in organometallic chemistry (63 pages) is concerned with the preparation of organosilicon compounds or with their use in organic synthesis, and much of the remainder with use of organotransition metal compounds as reagents or catalysts.

The book will serve as a useful point of entry for those seeking to assess the utility and scope of phase transfer catalysis.

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