

## Book Review

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### **The Chemistry of Transition Metal Carbides and Nitrides**

S. T. Oyama (ed.)  
Blackie A&P, 1996  
534 pages. £125.00  
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This 534-page volume is divided into 28 chapters with contributions from 96 authors; it largely results from a symposium held in Honolulu in 1995. Many of the chapters will be of most interest to material engineers and metallurgists, and it is in these areas that the spectacular advances seem to be occurring, including superconductivity in quaternary borocarbides.

The introductory chapter is difficult: it includes figures lacking adequate explanation and, in effect, tries to summarize the entire conference proceedings. Classifying the contributions has also been a problem and under the heading of 'Physical Properties' is found an interesting chapter on applications of carbides and nitrides in industrial tools. This is followed by three chapters under the heading 'Theory', and then 'New Materials', including

magnetic properties. New approaches to 'Synthesis' are treated next, followed by papers on 'Catalysis' with alkane isomerization reactions discussed in some detail. The chapters headed 'Spectroscopy' cover techniques for investigating, for example, chemisorption of CO and NO on  $\text{Mo}_2\text{C}$ , and the formation and properties of metal-nitride and -carbide nanoparticles.

Organometallic chemists will find interest in Chapter 15, which covers the synthesis of titanium and vanadium carbides using (for example) molecular cyclopentadienyl-metal bonded precursors. Chapter 27 is also relevant, being concerned with the formation of metal-carbide and -nitride nanoparticles by techniques such as laser pyrolysis of  $\text{C}_2\text{H}_4$  and  $\text{Mo}(\text{CO})_6$ . Other relevant chapters discuss the use of metal carbides as catalysts in Fischer–Tropsch reactions and the isomerization of alkanes catalysed by molybdenum oxycarbide, which is considered to involve metallacyclobutadiene intermediates.

All chapters appear to be well referenced and the book provides an excellent source of up-to-date information for those engaged in research in this area.

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