

## Out of the blue

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### **Chondrules and Their Origins.**

Edited by Elbert A. King.

*Lunar and Planetary Institute, Houston: 1984. Pp.377. \$33.*

CHONDRULES are millimetre-sized silicate assemblages found in meteorites and, like their hosts, they have a unique story to tell about the conditions in the early Solar System. Hitherto, information about them has been spread through a vast literature. So an entire book devoted to the topic is long overdue.

*Chondrules and their Origins* is essentially the proceedings of a two-day workshop held at the Lunar and Planetary Institute, Houston, in November 1982. It suffers all the strengths and weaknesses typical of such books. The contributed papers are highly variable in approach and quality — some are significant new contributions, a few are useful reviews, and some are brief re-statements of particular views — and the coverage of the subject is rather patchy. Several prominent contributors to the field are conspicuous by their absence and, while petrologic studies abound, chemical and isotopic papers are under-represented; of the 25 papers included, 14 deal with petrology, 3 with chemistry and 3 with isotopic studies (of which only one is on radiometry). There are also 5 which deal with model-making, qualitative and quantitative.

Examples of the useful reviews are the summary of radiometric work by Swindle, Caffee and Hohenberg, who conclude that the chondrule-forming epoch was brief and occurred at the time of the formation of the meteorites (and the Solar System), and the masterly synthesis of compositional data by Grossman and Wasson. The latter authors argue for a view that has become popular within the past few years, namely that chondrules were formed by the melting of pre-existing, fine-grained dust. The once-popular idea that chondrules could form directly by condensation from the nebular gas has almost no supporters now, although Blander advocates a modification of the idea. In a somewhat more narrowly-

focused, but equally worthwhile review, Taylor, Scott and Keil amass arguments against the idea that chondrules could form by impact, volcanism or accretional heating.

One notable example of an original contribution is the paper by Nagahara, who describes another major line of evidence that chondrules were made by melting pre-existing dust; she describes several grains which survived melting. Another is the article by R.N. Clayton and co-workers; on the basis of oxygen isotope data, they argue that although the chondrules from different classes of meteorite formed from different solid material, they were melted in a common gas. There are also two brief but fascinating accounts of astronomical data relevant to chondrule formation by D.D. Clayton and D. Heymann.

In his foreword, Elbert King, the editor, states that his aim was to provide a broad overview of current ideas. I am not convinced that the book succeeds totally, being top-heavy in specialized contributions and leaving certain areas devoid of attention. For example, a review of ideas on the heat-source which melted the chondrules would have been welcome. The book might also have come closer to achieving its aims had it been organized differently — the sequence of papers, alphabetical by first author, is probably the least helpful possible. Surely it would have been better to have gathered the papers by subject area, with each section being led by a review. Still, the book has served as a vehicle for many valuable papers which might not otherwise have been written, and for that Elbert King is to be congratulated.

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