



Celebrating 1000 issues

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Received: 22 April 2020

Accepted: 22 April 2020

Published online:

5 May 2020

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The Journal of Materials Science was founded in 1966 with the first issue appearing in February. The founding editor, Robert Wolfgang Cahn, was a key proponent in developing Materials Science as a distinct field bridging engineering and the natural sciences. Robert was himself a prolific author writing not only papers that are still relevant today but also editing books and writing a regular blog for the MRS Bulletin. He encouraged authors to submit review papers as explained in his own widely downloaded review paper entitled “A review of reviews” [1]. That first issue of the Journal of Materials Science includes one review paper, two letters and a book review. Of course, that first issue appeared long before the Internet and even the Journal of Materials Science did not go electronic until 2004. The journal has also moved from being a primarily Anglo-American

publication with just four issues per year to one with an international audience and 36 issues per year (Fig. 1).

The first paper in the Journal of Materials Science concerned the formation and devitrification of oxides on silicon, which was of critical importance to the rapidly growing semiconductor industry (Fig. 2) [2]. The author, F.W. Ainger, was working at the Allen Clark Research Center of Plessey, a major industrial R&D laboratory in the UK. Ainger later moved to Penn State University where he worked with our editorial board member, the late Eric Cross. This early link to industry has been a continuing feature of the Journal of Materials Science. Many of our papers—past and present—are directly relevant to industry which is reflected by the very large number of downloads. Incidentally, that first issue of the

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Figure 1 Our cover has evolved, but our mission has not.

JOURNAL OF MATERIALS SCIENCE 1 (1966) 1–13

The Formation and Devitrification of Oxides on Silicon

F. W. AINGER

Allen Clark Research Centre, The Plessey Co Ltd, Caswell, Towcester, Northants, U K

Received 30 September 1965

The thermal oxidation of silicon in various gaseous atmospheres has been studied and the growth rate data and activation energies determined. The oxide layers contained defects, the density of which increased with increasing temperature and time; microcracks were also observed. The devitrification of these oxides was studied at 1300° C and above in argon-oxygen atmospheres; water vapour was found effectively to catalyse the process. Sections of the devitrified oxide were prepared and examined with an electron microscope and electron diffraction patterns recorded. The latter exhibit a probable cubic structure, cell size 8.16 Å, which does not correspond to any published structure of crystalline silica. The formation of a “rosette” structure was also observed and was probably a stress-relief phenomenon. The origin of the rosette structure was traced to the Si-SiO₂ interface and revealed by controlled removal of the oxide layer.

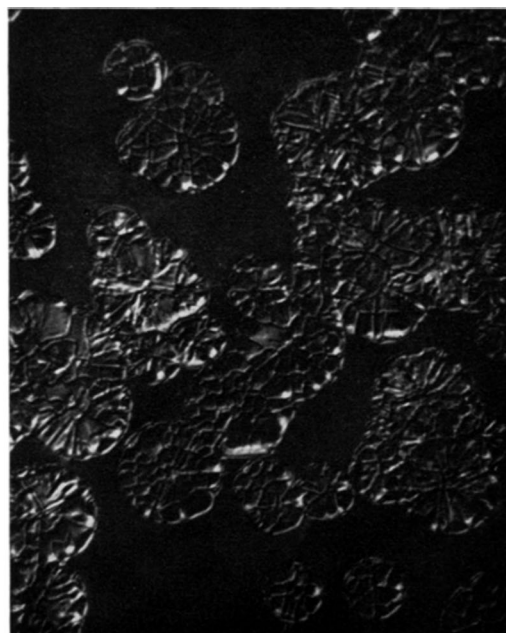


Figure 2 The first paper in the Journal of Materials Science and a TEM image of the rosettes referred to in the abstract.

Journal of Materials Science included a paper by Cockayne on garnet [3], one by the late Ron Bell on InSb [4], a paper on metallic solid solutions by King [5] and one by Keller on polyethylene [6]. So, from the start, the journal really was representative of the primary classes of materials: ceramics, metals, semiconductors and polymers.

As part of our celebration of 1000 issues, we have invited several editors and editorial board members to reflect on the eight most highly cited papers—“citation classics”—that have been published in the Journal of Materials Science. The editorials will

discuss why the selected articles have made such an impact.

We recognize that citations are not the only measure of the impact of a paper and that a paper may have a large impact but not be cited so often. As an example, Robert Cahn’s paper [1] was the most downloaded paper from the journal for several months but has only been cited twice. The number of downloads may be a much better measure of impact. Pekala’s review [7] on novolac aerogels was published in 1989, cited twice in 1990 but not at all in 1991. This original paper was downloaded nearly 600 times in 2019 and has been cited over 1200 times with

more citations in 2019 than in any previous year. German's 2009 review [8] on liquid-phase sintering has "only" been cited ~ 450 times, but it had 6000 verified downloads in 2019!

These 1000-citation papers are representative of the diversity of papers published in the Journal of Materials Science. Our papers are selected because they are complete reports on topics in materials science: the journal's cited half-life is frequently > 10 years.

We thank the tens of thousands of reviewers who have contributed to the success of the Journal of Materials Science over the past 64 years. We thank the many colleagues who have served as editors and as members of our editorial board or distinguished advisory board. In particular, we thank Robert Cahn for his vision and Bill Bonfield and Rees Rawlings for their stewardship as editors-in-chief. Each month we recognize Robert's founding of the journal by asking the editors to nominate finalists for the Cahn Prize [9]. Finally, we thank you, our readers, for your continued contributions to the Journal of Materials Science.

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