

Symposium Report

2ND INTERNATIONAL SYMPOSIUM ON CERAMIC MATERIALS AND COMPONENTS FOR ENGINES, TRAVEMÜNDE, NEAR LUBECK, FRG (14–17 APRIL, 1986)

This meeting followed the 1st Symposium held in Hakone, Japan, in October, 1983. The symposium was under the patronage of the German Ministry for Research and Technology (BMFT) and was co-sponsored by most national ceramic societies. The excellent administration was carried out by the German Ceramic Society (DKG), whilst the technical aspects were in the able hands of the Conference Chairman, Professor Bunk.

The great interest in the subject may be judged from the size of the attendance and the amount of information made available. More than 600 people from all over the world attended the symposium, which offered approximately 40 lectures and over 100 posters, as well as an exhibition with displays from several firms, covering raw materials, component manufacture and application of ceramics in engines (Daimler Benz and Volkswagen).

All activities took place in one very large hotel, which also accommodated most of the participants. There was ample space for the posters, which were displayed throughout the entire conference and could be viewed at any time (authors were available for discussion at set times); a very good scheme because it allowed poster authors to look at the other posters. The quality of posters varied greatly, the worst consisting of nothing more than the pinned-up typed sheets of the manuscript. Similar displays have been noticed at other conferences and it is highly desirable that conference organisers should give guidance as to what is to be expected.

Similarly, the standard of the slides used in lectures was often greatly inadequate. Many lecturers used 'typescripted' transparencies on the overhead projectors, which were barely readable from the front and quite undecipherable from the back of the lecture theatre. Again, it is felt that organisers could help by issuing instructions.

Professor Bunk opened the meeting with a progress review of the German ceramic engine project, pointing out that there was now a satisfactory supply of raw materials, and that prototypes of all envisaged ceramic components, e.g. turbine rotors, combustion chambers, valve gear cylinder liners, piston crowns, port liners, etc., have been produced by one or several ceramic manufacturers in silicon nitride, silicon carbide, aluminium titanate or zirconia. The port liner made of aluminium titanate has now been introduced into commercial models of Audi and Porsche. Professor Bunk was responsible for this project during the years 1974–85 with a total spending of 71M DM on a 50/50 basis with industry. A much larger general materials programme has now started which up to 1994 will have a budgeted expenditure of 200M DM. The ceramic part will be concerned with powder processing, reliability of components, composites and the joining of ceramics to metals.

At the Hakone conference, the Japanese announced the introduction of a ceramic turbocharger into a commercial car model. It would appear that there was some delay, but since October 1985, Nissan's Fair Lady incorporates a ceramic turbocharger with its advantage of providing greater acceleration resulting from the lower density of the ceramic. In the USA, Ford were carrying out extensive tests on ceramic turbochargers in cars and Cummins continue with their activity on the uncooled diesel engine for trucks.

In conclusion, it should be said that none of the lectures and posters indicated a dramatic breakthrough but steady progress was being made, although the rate of progress is now probably somewhat slower than was hoped for some years ago.

The full proceedings of the Symposium will be published by the DKG in a volume priced at 145 DM. It was announced that the 3rd Symposium will be held in the USA in 1988.

HANNOVER INDUSTRIAL FAIR (9–16 APRIL, 1986)

This event overlapped with the previously reported symposium. The participants of the symposium must be grateful to the organiser for providing

transport from Travemünde to Hannover, which enabled them to visit this important industrial exhibition during the two days preceding the symposium. From the ceramic point of view, two out of the 24 halls were of particular interest: those devoted to 'Research and Technology' and 'New Materials'. In the first mentioned hall, universities, research institutes and private research organisations exhibited their work and willingly discussed projects with potential customers. Daimler Benz, which now includes Dornier, Motor Turbo Union and AEG, and Volkswagen, indicated their interest in exploring the use of ceramics in gas turbines and reciprocating engines. On a long-term basis, Dornier is experimenting with the production of hydrogen by electrolysis of water, making use of the ionic conductivity of zirconia.

The 'New Materials' exhibition hall was devoted to all types of materials, but ceramics were the most prominent. Besides Feldmühle Hoechst Ceramtec (formerly Rosenthal Technik) and ESK, there were foreign exhibitors from the USA, Japan, UK and France. The main interest centred on engineering ceramics and cutting tools.

Paul Popper