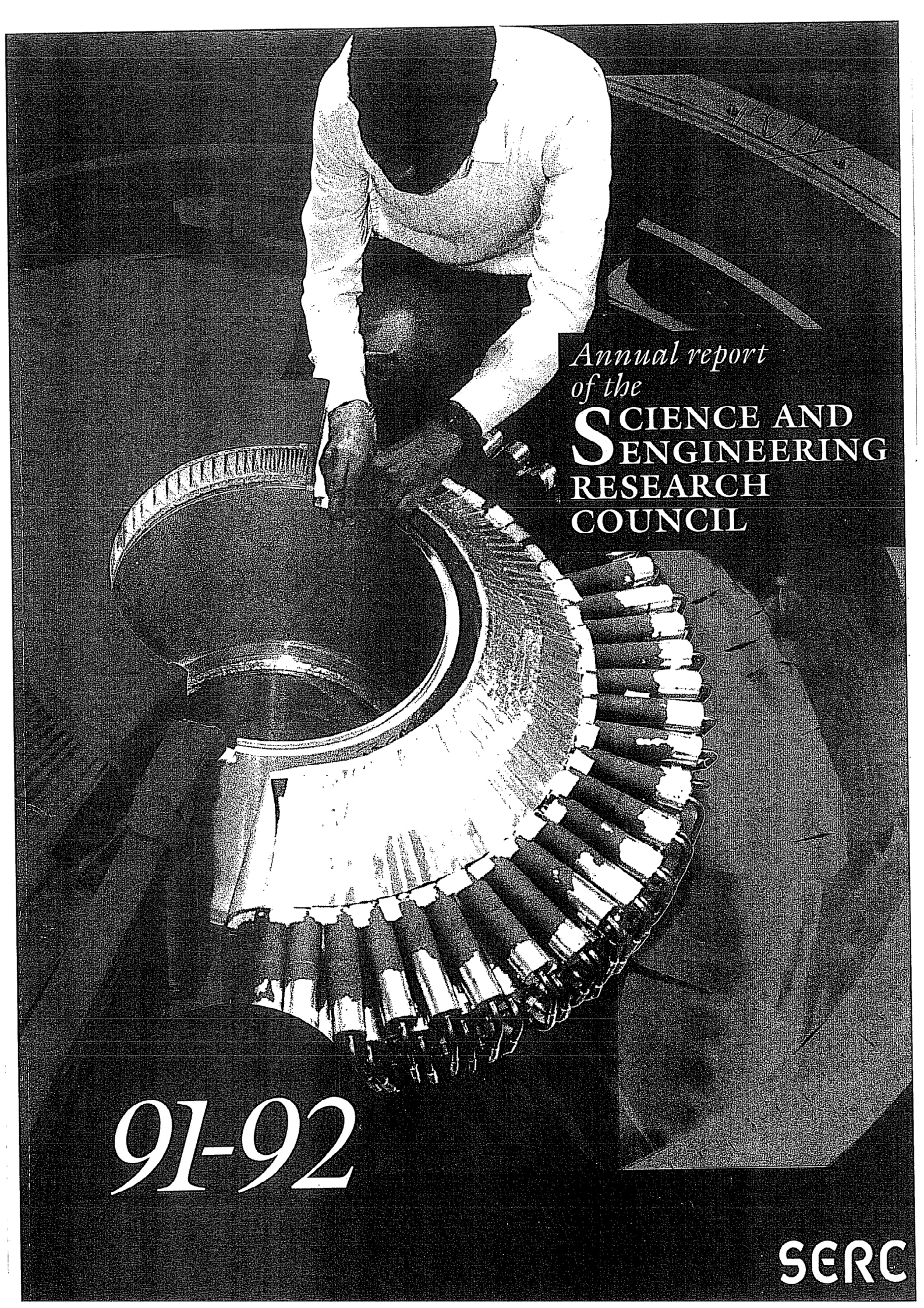


Annual report of the

SCIENCE AND ENGINEERING RESEARCH COUNCIL

91-92

SERC

Report of the

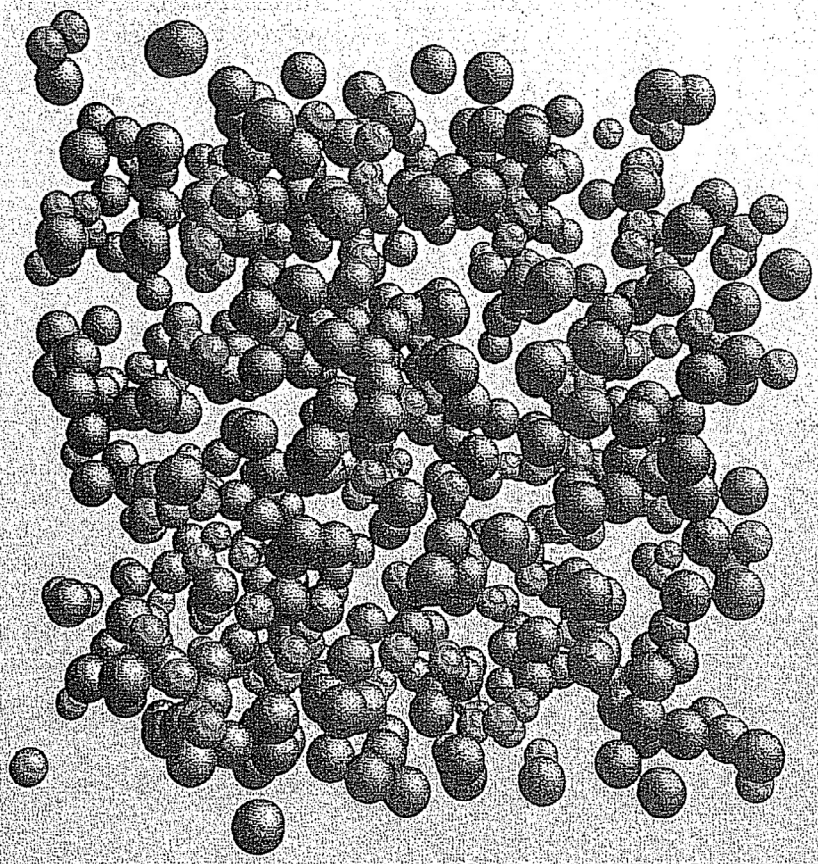
SCIENCE AND ENGINEERING RESEARCH COUNCIL

for the year

1991-92

Laid before Parliament
pursuant to the
Science and Technology Act, 1965
on 14 December 1992

£8.00 net



'DIAMOND-LIKE' CARBON

Under certain conditions it is possible to deposit thin films or coatings of a carbon-hydrogen alloy which are denser, harder and more chemically resistant than any other carbonaceous material. The material also behaves as a semiconductor and is fully biocompatible. There are many potential applications such as protective coatings for hip replacements, artificial heart valves and plastic contact lenses.

Although alloy suggests the presence of diamond like chemical bonds, a series of experiments by physicists from Kent University has begun to reveal in detail the true nature of the highly complex arrangements of atoms from which these intriguing properties ultimately arise. Several instruments at Isis, the spallation neutron source at SERC's Rutherford Appleton Laboratory, are being used in the research. Computer modelling based on Isis data (see picture) is revealing fresh insights into possible atomic conformations.

of archaeological material. A joint research programme is planned with the Natural Environment Research Council on ancient biomolecules with the aim of applying modern molecular biology techniques to archaeology.

MATERIALS TO BOOST INDUSTRY

The Materials Commission seeks to promote excellence of research and training taking an integrated view of materials research, from synthesis through processing to demonstrator projects. It has a wide ranging programme to encourage the development of existing materials and the emergence of new materials of value to British industry. The percentage commitments to research grants (excluding IRCs) in terms of material type are: polymers 17%, ceramics 16%, metals 16%, superconducting materials 10%, electronic materials 31% and medical engineering and sensors 10%. Some 13% of the commitment is on LINK programmes in collaboration with DTI and industry. It is also responsible for five IRCs, in superconductivity, semiconductor materials, biomaterials, polymers and materials for high-performance applications.

A highlight from Birmingham University is the development of an efficient and reproducible method of preparing almost single-phase T1-2223 material with a T_c of 128K. The method involves synthesising a material with nominal stoichiometry, followed by heat treatments over more than ten days. The material produced is very stable. It appears that the optimisation of hole concentration in T1-2223 is crucially important to attaining such a high transition temperature.

And reflected in:
"A far sighted Investment: SERC & Scientific Achievement", p11, 1993
And "Materials – a key technology" SERC 1993