

THE BRITISH COAL UTILISATION RESEARCH ASSOCIATIONInformation Circular No. 24The Preparation and Properties of Extruded and Slipcast Zirconby J. H. McKee and A. M. AdamsSUMMARY

The production of high grade zircon ceramic material of good thermal shock resistance is described. Its use in the form of crucibles, refractory tubes, pyrometer sheaths and other shapes for high temperature work is suggested. Its use as an electrical insulating material is a further possibility but the necessary tests have still to be made.

Introduction

Since about 1941, when B.C.U.R.A. first became interested in zircon as a furnace refractory because of its resistance to coal ash slag attack, considerable progress has been achieved in the fabrication of bricks having good underload strength, and also of other products such as zircon cement. This work has been described in a number of patents¹ and publications.^{2,3,4}

More recently the possibility of extending the use of zircon beyond that of a refractory material into the field of high temperature ceramics has been considered. In this way further application could be made not only of the material's resistance to slag, e.g. as a replacement for alumina thermocouple sheaths in the measurement of fuel bed temperatures, but also of other desirable properties, such as its good thermal shock resistance. The stimulus to carry out work in this field came from the Ministry of Supply in the form of a research contract to examine the suitability of zircon as a turbine blade material on behalf of the Royal Aircraft Establishment. Work began in January, 1948.

A brief resumé of the more important results obtained are set out in the following paragraphs. A more detailed account is available in the form of a report entitled "The Physical Properties of Extruded and Slipcast Zircon with particular reference to Thermal Shock Resistance" by J. H. McKee and A. M. Adams, loan copies of which are available in the B.C.U.R.A. Library.