

THERMOGRAVIMETRY OF SiC FROM RICE HUSK

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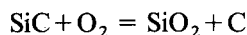
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The thermogravimetric analysis of SiC from rice husk has not been performed so far [1–5] as this process has only recently been developed. However, as the product is formed in a hydrocarbon or CO₂ atmosphere [6], followed by purification by chemical treatment, its TG study will be of significance. The carbon is most likely to be in graphitized form. The HF treatment required for the removal of SiO₂ can leave some impurities in SiC. When the purified product is heated during thermogravimetric analysis in air, therefore, some weight loss is bound to occur. In fact, the utilization of such SiC in composites etc. can have serious repercussions.

Such a TG study can also shed light on the thermal resistance property of the whiskers, which is of importance in application in rocket nozzles [7]. Reoxidation of SiC occurs in atmospheric oxygen at elevated temperatures:



However, complete oxidation is not possible at the temperature at which the TG study was conducted, i.e. 1450°.

The analysis was carried out in the Stanton combined DTA–TG apparatus. Only Pd and Ni-incorporated reaction products were subjected to thermal analysis. 0.1% of catalyst was added in both cases. It has been shown previously that these catalysts bring about an increase in yield [8]. The details of SiC formation were described earlier [6].

The TG curves for the Pd and Ni catalyst products are depicted in Figs 1 and 2, respectively. Products were formed at 1500, 1600 and 1800°. In the case of Ni, the study could be conducted up to 1150° for the products obtained at 1600° and at 1800°, unlike other cases. For both catalysts, the weight loss was lower than 1% for the products obtained at 1600 and 1800° (I and II). On the other hand, the product formed at 1500° undergoes a severe weight loss which increases up to 3% at 1450°.

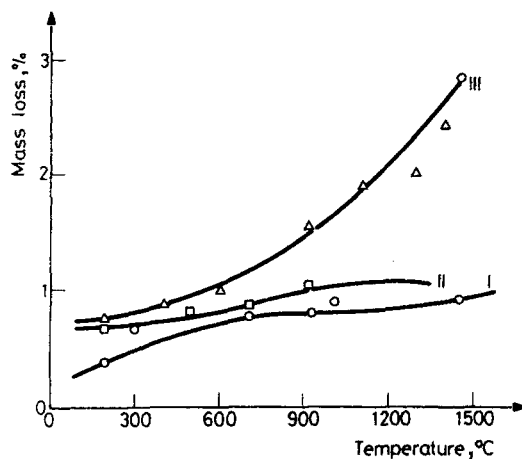


Fig. 1 TG curves of β -SiC (Pd -0.1%); production temperatures: I = 1800 °C, II = 1600 °C, III = 1500 °C

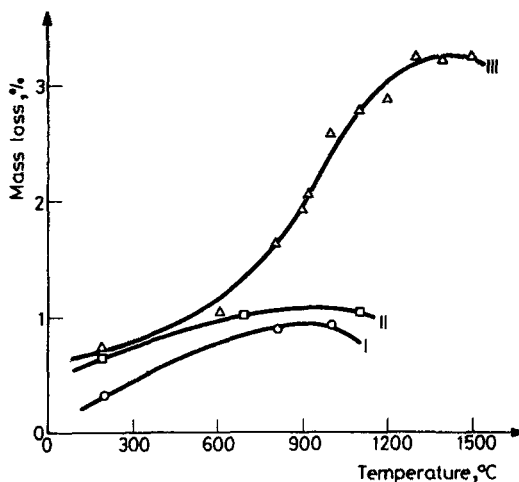


Fig. 2 TG curves of β -SiC (Ni -0.1%); production temperatures: I = 1800 °C, II = 1600 °C, III = 1500 °C

Even at 1000°, the weight loss was as much as 2%. The reasons for the weight loss are:

- 1 carbon contamination,
- 2 impurities introduced during acidification,
- 3 partial oxidation.

References

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