

# NUCLEAR RADIATION EFFECT ON COMPOSITE GRAPHITE-PYROCARBON BODIES OBTAINED BY THERMAL CRACKING OF NATURAL GAS.

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Preparation and main characteristics of these composite bodies, named "BB5 G", are briefly reviewed. Their composition is about 50 % pyrocarbon deposited from natural gas thermal cracking at a temperature below 1000°C and 50 % artificial graphite powder. Apparent density is 1.7 to 1.8 and some characteristics are particularly attractive.

Dimensional changes induced by neutron irradiations at temperatures approx. 60°C, 350°C and 450°C have been measured on these materials and on conventional nuclear graphites as references. Fast neutron doses ( $E > 1$  MeV) were respectively about  $4 \cdot 10^{20}$  n/cm<sup>2</sup> for the former temperature and 1.1 to  $1.3 \cdot 10^{21}$  n/cm<sup>2</sup> for the two latter.

At about 60°C, "BB5 G" bodies show an expansion which can reach 4.0 %, to be compared to about 2.0 % (parallel direction) and 4.0 % (perpendicular direction) for a conventional extruded nuclear French graphite - moderator grade-- taken as a reference.

At 350 and 450°C, a shrinkage is observed, which can reach respectively 0.70 % or about 1.00 %, to be compared to 0.45 % (parallel direction) and 0.35 % (perpendicular direction) for an other conventional extruded nuclear graphite - sleeves grade - taken as reference in this second case.

For 60°C irradiations, it was observed that dimensional changes depend on the anisotropy given to the body by moulding or extruding technique. This points out contribution to the bulk behaviour of the body of artificial graphite powder used. Comments are made on this point and also on practical nuclear applications of this new material.

(10 minutes).