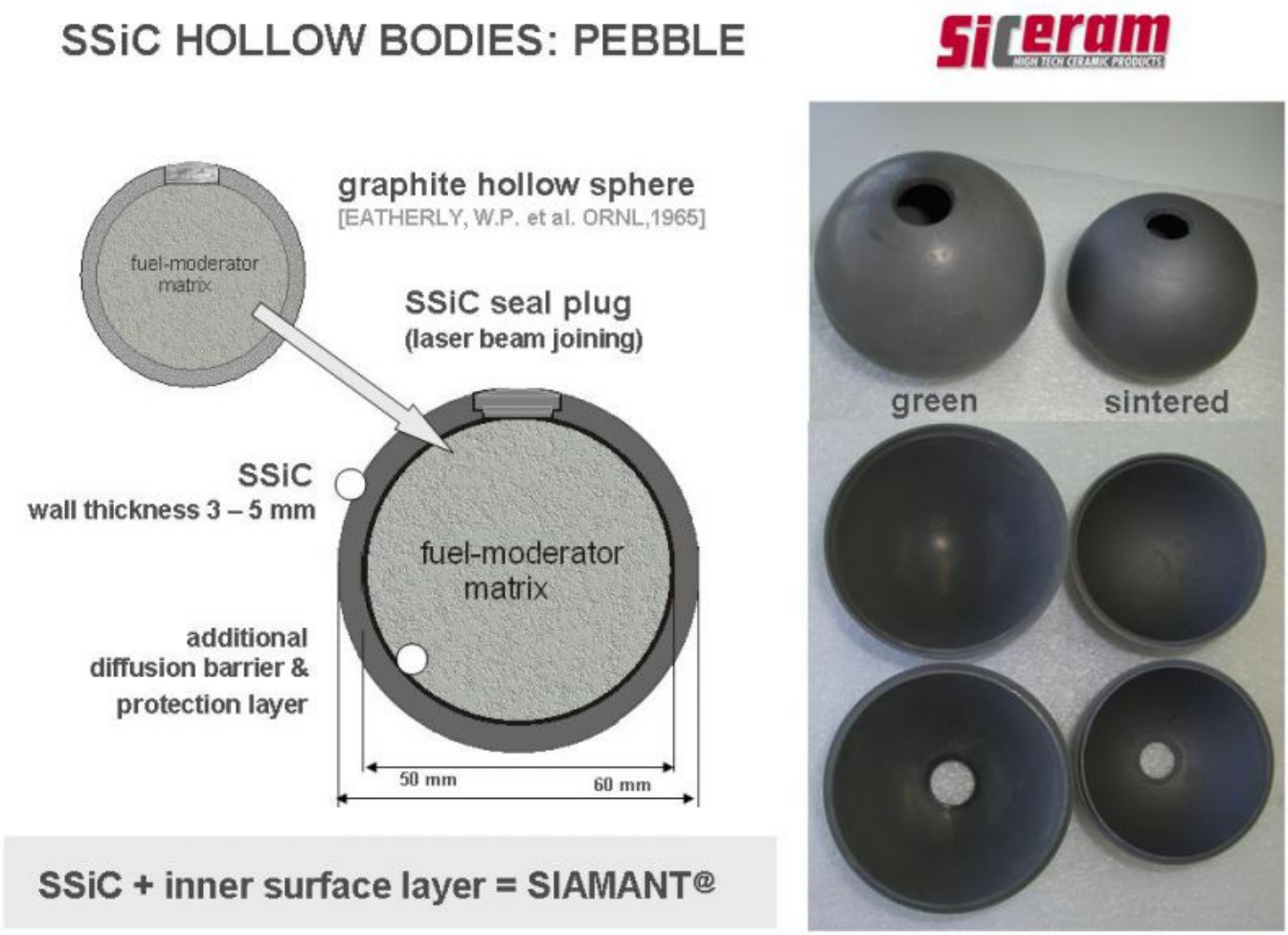
SSiC HOLLOW BODIES: PEBBLE



About 50 years ago, the pioneers of the pebble bed reactor developed a spherical fuel element, which is still considered as the standard design:

- an inner spherical, fuel containing and moderator region
- an outer fuel-free graphite shell.

Since long experts share the opinion that corrosion-resistant pebbles with high retention capability for fission products would improve considerably the chances of the PEBBLE BED REACTOR as VERY HIGH TEMPERATURE REACTOR.

The **outer graphite shell** has been identified as the **dominating weak point** of the standard pebble design. Many efforts have been undertaken since then to improve the properties by surface coating or by encapsulation.

After careful weighing the pros and cons of the different methods, the **SSiC hollow sphere with a thick wall** has been selected as the most promising concept. This design takes up an early day's idea, when hollow spheres were machined from graphite blocks and filled with a moderator–fuel-matrix.

It turned out that the manufacturing of SSiC hollow spheres was not so easy. After trials and errors the authors now trust two methods, which have the potential for production on industrial scale:

- half spheres: injection moulding plus plastic welding in green state.
- full sphere production: injection moulding with a lost core.

An additional layer on the inner surface enhances the retention capability and acts as a sophisticated protection layer for SSiC against aggressive fission products (confer to cfn1-17).