

INTEGRATED EUROPEAN MATERIALS PROGRAMME FOR DEMO

APPLICATIONS: RECENT ACHIEVEMENTS AND CHALLENGES

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The performance and reliability issues involving materials mainly for in-vessel components are foremost considerations in the successful development and deployment of future demonstration fusion reactor systems. Due to the demanding operation conditions (power conversion, longer operating periods), materials will have to sustain higher thermal, neutron and other particle loads. Therefore, many solutions that could be developed for ITER will not work in a DEMO reactor. Remarkable progress in materials development and in the increase of their maturity level has been made over the past years. Yet, there are open questions that have to be answered and knowledge gaps that have to be closed in the near future.

The present paper reviews the recent progress of the EFDA Topical Group on Fusion Materials with the focus on high-heat flux materials and integrated radiation effect modeling including experimental validation. The recent progress in fusion materials development and technology is discussed. This comprises tungsten composites, self-passivation alloys, powder injection molding as well as ODS steels production. Finally, the strategy of the EUROfusion Material Project is outlined.