Beryllium Migration in JET ITER-like Wall Plasmas

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INTRODUCTION

- Beryllium Plasma-Facing Components (PFCs) used in the main chamber of JET and foreseen in ITER owing to low atomic mass, low retention and oxygen gettering.
- Main chamber impurity source in divertor configuration assumed to be driven by charge-exchange neutrals. Exchange of C PFCs by Be PFC shall lead to similar primary erosion source, thus, similar global migration.

- Re-erosion of deposited Be in the divertor is expected to be strongly reduced due to absence of ordinary chemical erosion like observed with carbon (JET-C). Transport of Be to remote areas shall be strongly reduced.

JET ITER-LIKE WALL EXPERIMENT

- JET ITER-Like Wall operation [2] with Be in the main chamber and W in the divertor started in 2011

RESIDUAL CARBON CONTENT IN THE JET VESSEL

- CII edge flux normalised to density shows drop by a factor 20 (average) with installation of the ILW
- Residual C from back-side of W, uncleaned areas, all leaks and from W-coating/intrinsic impurity
- Post-mortem analysis confirms reduction by a factor ten - residual C predominantly in divertor

MATERIAL PROBE EROSION: CAMPAIGN INTEGRATED FOOTPRINT OF MATERIAL MIGRATION

- Strong reduction of overall material migration with the JET-ILW (Be PFCs) in comparison with JET-C (C PFCs) measured.
- Strongest reduction at the bottom of the divertor and in recessed areas.

CAMPAIGN INTEGRATED FOOTPRINT OF MATERIAL MIGRATION

- All Be found in the divertor results from the main chamber as no primary Be divertor source exists!
- Be migration needs to be devided into transport in the limiter phase and in the divertor phase

References