APEX Materials Group — Key Issues and Plans (11/98)
S.J. Zinkle

1. Chemical compatibility of structural materials with coolants (He, Li, Pb-Li, Sn-Li, Flibe)

    - Planned work by 5/99: complete analysis of temperature limits (5 μm/yr erosion) and prepare written report, based on published corrosion studies

    - Additional data are needed for several cases (e.g. Flibe/V, Sn-Li/V, Flibe/Ta, Sn-Li/Ta, etc.)

        – is APEX interested in providing resources for experiment?
        – prioritized ranking?

2. Need experimental data on radiation embrittlement of refractory alloys at "high" temperatures (focus on 500-800°C)

    - Planned work by 5/99: document all known published studies on mechanical properties of irradiated refractory alloys
        – very few fracture mechanics – relevant data

    - Further work is needed to develop the design methodology for brittle structural materials (cf. ITER flow chart)

    - Consider possibility of a few focused irradiation studies? (most likely "piggyback" irradiations) – need prioritized materials ranking

3. Transition joints between dissimilar materials (V/W, etc.)

    - Planned work by 5/99: summarize possible joining methods for high-temperature dissimilar materials (diffusion bonding, stir friction welding (?), etc.)

    - Make recommendations for prioritized experimental studies?

4. Provide input on fabrication of refractory alloys (Mo, W) upon request.