

Ductile tungsten (W) pipes for divertor applications

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Introduction

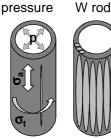
Tungsten, the metal with the highest meting point, has many advantages such as high temperature strength, high creep resistance and a high thermal conductivity. This makes tungsten a premium candidate for high temperature applications like e.g. in fusion energy. The disadvantage of tungsten however is its inherent brittleness. This rises the following questions: How can we make tungsten ductile? And how can we then fabricate ductile tungsten pipes for structural applications?





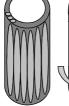


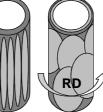






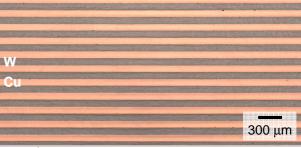
How to make a W pipe?



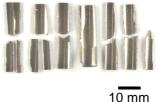


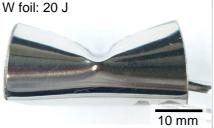
W foil

5 mm

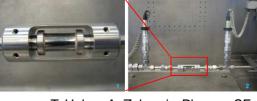


Charpy impact test at 300°C W rod: 0 J



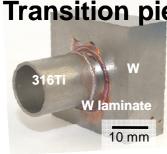


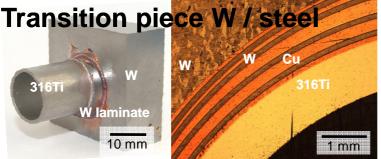
Internal pressure test at RT 1000 bar, pipe o.k.

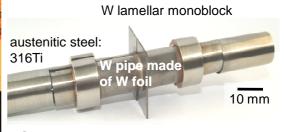


T. Huber, A. Zabernig, Plansee SE

Mockups







Structural W material

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