# Verification of codes with permeation simulations

Material: Tungsten

Atomic density:  **Wm-3**

Tetrahedral interstitial site (TIS) density:

Diffusion **m2s-1**

Solubility **H/W Pa-1/2**

For the test case, 3 trap types are considered with all a trap concentration of atomic fraction (at.fr.). The detrapping energy are:

Trap 1:  **eV**

Trap 2:  **eV**

Trap 3: **eV**

For each trap, the pre-exponential frequency for trapping ( indices) and detrapping ( indices)are  **s-1**

For each trap, the trapping energy is the diffusion energy **eV**

Sample and exposure conditions:

Thickness:  **mm**

Temperature:  **K**

Pression of H2:  **Pa** (Pressure at the front side, No pressure at the back side)

Analytical solutions:

From Candido and Alberghi, Fusion Engineering and Design 172 (2021) 112740

H concentration:  **Hm-3** (concentration at the front side)

Pure diffusion case:

**in Hm-2s-1**

Weak trap:

**in Hm-2s-1**

With and

Strong trap:

The breakthrough time is defined as:  **(in seconds)**

Verification for MHIMS:

