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Title: Influence of alloying of tungsten with transition-metal on dislocation core structure and value of Peierls stress and Peierls potential from first principles.

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A set of transition metal was examined to substitute of Re in tungsten rhenium alloys with the same "Re ductilizing effect". We investigate the core structure, Peierls stress and Peierls potential of $\frac{1}{2}\langle 111 \rangle$ screw dislocations in binary tungsten-transition metal alloys $W_{1-x}Tm_x$ based on first principles electronic structure calculations. The periodical quadrupole approach was applied to describe structure of $\frac{1}{2}\langle 111 \rangle$ dislocation. The alloying with transition metals was modeled within the virtual crystal approximation. It was demonstrated that alloying W with a group VIIIA transition metal changes the structure of the dislocation core from symmetric to asymmetric. Together with the core symmetry change, the value of the Peierls stress and Peierls barrier is reduced. Our results demonstrate that similar to ?Re ductilizing effects? could be achieved with any of the transition metals from the VIIIA group.