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ABSTRACT: Fusion reactors undergo severe particle radiation and require advanced plasma-facing materials. After an accident, the lack of coolant causes water vapor to enter the vacuum chamber, which brings serious safety risks to the material. In the absence of a coolant, the temperature of the tungsten alloys facing the plasma may reach 1200 °C. At this temperature, tungsten are directly oxidized and volatilized, thus causing plasma pollution. The oxidation-resistant tungsten alloys in this study is expected to solve this problem. In this work, the improvements and mechanisms of different alloying elements with regard to the oxidation resistance of tungsten alloys, combined with the results in recent studies, were reviewed, and possible development trends were discussed.