This work concerns the study of the high-temperature oxidation of $AlTi_{0,5}CrFeNi$ high-entropy alloy at 800 °C, 900 °C and 1000 °C for 100 h and the understanding of this phenomenon. The thermodynamics of oxidation is examined by calculating the Ellingham diagram. The oxidation kinetics is investigated by mass increment method and thermogravimetric analysis. The activation energy of oxidation is calculated from the thermogravimetric curves. The microstructures of the samples before and after oxidation and the layer of oxides are characterized by scanning electron microscopy and energy-dispersive X-ray spectroscopy. The microhardness of the material is measured in its as-cast state and after each oxidation experiment. The results are compared with other alloys for high-temperature applications and it is asserted that further research of this alloy may be promising.