

عنوان مقاله:

Effects of temperature and pH on the corrosion behavior of NiTi orthodontic arch wire in artificial saliva

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خلاصه مقاله:

There are few studies on the electrochemical corrosion behavior of Nitinol at various pH and temperature. Considering the pH of mouth can alter at a wide range, the present study investigated the effects of various pH and temperature of artificial saliva on the electrochemical stability of commercial equiatomic Ni-Ti orthodontic wire. In this manner, cyclic polarization tests were performed at different temperatures and pH. Surface conditions of wires were evaluated with Scanning-Electron Microscopy. Decreasing of pH to the acidic pHs and increasing of temperature in these pHs cause to increasing of I_{cor} and C.R. and decreasing of E_{pit} and E_{pro}. The SEM micrographs indicate that the surface of sample become smoother after cyclic potentiodynamic tests. In fact, cyclic potentiodynamic tests cause to a general corrosion on the surface of sample. Corrosion behaviour of NiTi completely relies on the characteristics of its passive layer. Decreasing of pH causes to partly dissolution of the passive layer of NiTi in the acidic pHs. Influence of temperature on the corrosion behaviour of NiTi, related to the pH of solution. It appears that pitting critical temperature of NiTi in the artificial saliva is higher than ۴۲ °C.

کلمات کلیدی:

Nitinol, Orthodontic Wire, Corrosion, Artificial Saliva

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