

Nickel-free austenitic stainless steels for medical applications

REVIEW ARTICLE

Author Ke Yang and Yibin Ren

Affiliations Institute of Metal Research, Chinese Academy of Sciences, 72 Wenhua Road, Shenyang 110016, People's Republic of China

E-mail kyang@imr.ac.cn

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Abstract The adverse effects of nickel ions being released into the human body have prompted the development of high-nitrogen nickel-free austenitic stainless steels for medical applications. Nitrogen not only replaces nickel for austenitic structure stability but also much improves steel properties. Here we review the harmful effects associated with nickel in medical stainless steels, the advantages of nitrogen in stainless steels, and emphatically, the development of high-nitrogen nickel-free stainless steels for medical applications. By combining the benefits of stable austenitic structure, high strength and good plasticity, better corrosion and wear resistances, and superior biocompatibility compared to the currently used 316L stainless steel, the newly developed high-nitrogen nickel-free stainless steel is a reliable substitute for the conventional medical stainless steels.

PACS [87.85.J- Biomaterials](#)
[81.40.Lm Deformation, plasticity, and creep](#)
[81.65.Kn Corrosion protection](#)
[62.20.F- Deformation and plasticity](#)
[81.40.Pq Friction, lubrication, and wear](#)
[62.20.Qp Friction, tribology, and hardness](#)

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