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Hardness Enhancement on Stainless Steel Surface by Coating Graphene Film Using Thermal Chemical Vapor Deposition

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Stainless steel is steel alloy consisting of many elements including iron (majority), chromium, nickel and sulfur. Stainless steel has been widely utilized because it is more effective in terms of resistance of corrosion, rust or stain than ordinary steel. However, the electrical conductivity and surface hardness of stainless steel are not high. These disadvantages limit the engineering application of stainless steel from wide range to some range. Graphene is an allotrope of carbon, in which carbon atoms are arranged into a one-atom-thick honeycomb lattice. Graphene has a variety of exotic properties such as great electronic properties and excellent mechanical properties. In this report, therefore, we have investigated hardness enhancement on stainless steel surface after coating graphene film by thermal chemical vapor deposition. The results show the hardness of stainless steel after coated with graphene is ~ 10 times higher than original stainless steel.

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