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**Titanium and High Temperature Alloys**

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**Acknowledgement**

Mr John Gibson is a highly regarded educator and engineer. John taught Industrial Arts at a number of high schools before taking a position at Sydney Teachers’ College, then University of Sydney. He had an engineering education consultancy and has extensive experiencing working with NESA on Engineering Studies syllabus development and the HSC examination committee. The STEM Industry School Partnerships (SISP) Program asked John for his responses to the iTeachSTEM topic discussion questions. SISP is grateful to John for submitting these example discussion responses.

# Discuss the properties of titanium alloy.

* high melting point (1725°C)
* chemically very active – SG 4.5
* allotropic – solution-treated at 850°C, aged 500°C for 24 hours
* high ductility 50%
* low tensile strength – 216 MPa; alloys can raise this to 700 MPa
* forms a dense oxide skin on the surface – very high degree of corrosion resistance

1. **Discuss titanium alloy composites.**

* 2TA10 AI 6% V 4% sheet and strip
* 2TA28 AI 6% V 4% forgings
* TA48 AI 4% Mo 4% Sn 2% flaps and slat tracks
* TA52 Cu 2.5% sheet and strip

1. **Describe innovative high temperature materials and their applications.**

* Increasingly important as an engineering material in its own right – pure and alloyed forms.
* High melting point (1725°C) – useful in jet engines. Creep and fatigue figures are desirable.
* Used in airframe and engine components of modern supersonic aircraft.