The use of titanium metal in the sport and leisure industry.

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Introduction
Industry today
Devices & Equipment
Materials
Manufacturing
Current usage
The why
Introduction

Sporting performance improvements are linked to adaptation of developments in material technologies.

Aluminium alloys
Polymer composites
Titanium metal
Titanium ore is an abundant resource
Many manufacturing methods
Growth in the additive manufacturing sector is good for advanced materials.
Low demand
Equipment & Devices

Titanium use;
Golf
Para sports
Injury and rehabilitation
Athletics/team sports
Skiing
Cycling
Instrumentation and smart devices
Material properties

Titanium;
low mass, high strength, high corrosion resistance, bio compatibility, quality perception

Challenges;
cost, processability, supply/demand
Manufacturing processes

Traditional; Machining, casting, forging, fabrication

Advanced; Spray coating, vapour deposition

Powder metallurgy; Additive manufacturing, press and sinter, particulate injection moulding (PIM).
Particulate injection moulding

MIM in sport and leisure

- GKN Sinter Metals Germany
- Callaway’s FT-iZ Hybrid golf
- Element22 Germany
- Mimest SpA, Italy
- AME Powder Technology Ltd
Conclusion

Materials and process research can minimise the risk element of product development. PIM is one process to do this with benefits of; titanium performance, waste minimisation, geometrical complexities, cost savings.

Do not look for replacement processes, use enabling technologies to support future equipment.
Thank you?

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