



Light Alloys

The light alloys encompass aluminium, magnesium and titanium- based materials. Light alloy metallic components will continue to be used in airframes and moderate temperature aeroengine applications, in combination with composites in hybrid structures, for the foreseeable future. Metallic materials are also locked into existing designs that have long future production and operating lives. With the significant advances in alloy development, manufacture and joining, metallic structures can compete very effectively with composites in many applications, particularly where lower cost solutions are required, for short haul commercial aircraft.

Key drivers include:

- Lower weight and reduced cost through integrated manufacturing and the introduction of higher performance alloys
- New surface treatment and coating technologies

The School of Materials is making a major contribution in these areas and has particular expertise in:

- Welding and joining including friction stir welding
- Forming, including creep-ageforming and superplastic forming
- Alloy design, thermomechanical processing and microstructure modelling
- Surface engineering, chromate-free solutions, novel functional coatings
- Advanced techniques for materials characterisation

- Supported Airbus in the introduction of welded airframe integrated structures
- Supported BAE Systems in the development of superplastic forming technologies
- £6 million EPSRC Portfolio Partnership in Light Alloys Towards Environmentally Sustainable Transport (LATEST)

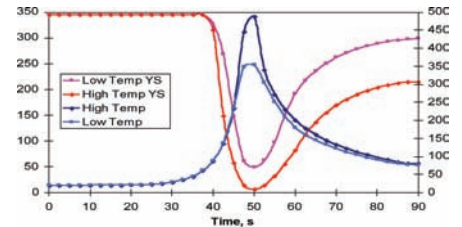
Research areas

Research in light alloys is wide ranging, but is mainly aimed at addressing the key drivers and themes listed overleaf. It is thus focused on studying and predicating materials interactions with advanced manufacturing and joining techniques, as well as the development of new surface treatment and coating technologies. The Group offers an integrated approach to supporting the whole manufacturing cycle for metallic aerospace components.

Emphasis is placed on providing the fundamental understanding required to efficiently introduce and optimise new processes and technologies. This includes basic scientific studies of the physics involved as well as the development of modelling tools to decrease the reliance on an empirical approach to process development and, hence, reduce time to market.

The Group is also involved with the main material suppliers in the development of new alloy solutions for aerospace applications.

Substantial core funding is provided by the Manchester EPSRC Portfolio Partnership in Light Alloys Towards Environmentally Sustainable Transport (LATEST).



Research facilities

Research facilities are extensive and include:

- Thermodynamic and microstructure modelling tools
- Instrumented friction and inertia welding facilities
- Severe deformation processing (ECAE)
- Thermomechanical and weld simulation
- High resolution electron microscopy and analysis
- Surface treatment, laser surface processing and coatings

Relevant postgraduate study

MSc in Advanced Engineering Materials

This Masters course will expose you to the next generation of high performance engineering materials and provide you with an in-depth understanding of the key factors that govern their design and selection for use in advanced engineering applications, as well as their processing, properties and stability.

MSc in Corrosion Control Engineering

This Masters course provides you with a thorough grounding in corrosion and its control. You will explore principles, protection strategies, and industrial applications, preparing you for either a career in industry as a corrosion scientist or engineer, or for cutting edge academic research.

Research degrees

Student research degrees in metallic materials are based within a vibrant research group, which is one of the largest in the UK. The research encompasses all aspects of metals, alloys and composites, including their design, processing, forming, joining and performance.

Academic staff



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