Special Alloy Fabrication

ALLOY DEVELOPMENT

Over the last 20 years ATI Wah Chang has played a major role in the development and production of a wide variety of zirconium, niobium, tantalum, vanadium and specialty titanium alloys for the nuclear and aerospace industries. The company's success in this field is often linked to its ability to maintain high levels of alloy purity.

In other cases, ATI Wah Chang's ability to evaluate a wide variety of melting and fabrication process unique to refractory metals has been a key to its successful development of new materials. Over the last ten years, the company's diversifying product lines and customer base have demanded a continual use of all of its alloy development capabilities. Consequently, ATI Wah Chang maintains a team of personnel and associated equipment specifically devoted to developmental melting and fabrication of refractory metals. The company routinely provides these services to aerospace and nuclear companies as well as laboratories worldwide. In the last several years, personnel have prepared dozens of experimental alloys. Some of these include advanced zirconium, vanadium, and niobium alloys for the nuclear industry and titanium aluminides, niobium aluminides, as well as refractory base alloys for hydrogen storage.

Composition and microstructure of all materials can be evaluated at ATI Wah Chang. Its physical property measurements, including hardness, bending, and tensile testing at room temperature and at elevated temperatures up to 1316°C (2400°F) under high vacuum.

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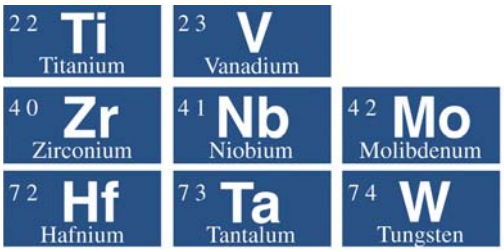
Table 1. Alloy Preparation	
Expertise in:	Available as:
Niobium Hafnium Tantalum Titanium Zirconium Vanadium Molybdenum	Buttons 5- g to 1 kg Ingots 5 kg to over 25kg

Table 2. These two tables describe services offered by Wah Chang's Alloy Fabrication Group.	
Melting/Casting Process	Shapes
Button	Round, Square, or Cylindrical
Drop Casting	25 x 25 x 100 mm (1"x1"x4")
Consumable Vac Arc	100 (4"), 125 (5"), and (6") diameter (7000 amps max.)

Table 3.
The elements below are typical metals purified and alloyed by EB melting.



ATI Wah Chang's R&D laboratory is also equipped for development of high-temperature fabrication parameters for refractory metals. Pilot scale ingots weighing 5 to 25 kg can be forged and hot rolled at temperatures up to 1600°C (2912°F). Lab-scale hot working equipment includes a 3.5 MN (400-ton) controlled strain rate (0-30mm/sec) forge press and a 300-mm (12 in.) wide universal rolling mill. Extrusion, cold rolling, wire drawing, as well as swaging facilities are also available. Processing parameters for new alloys are often investigated on a pilot scale with these facilities prior to attempting fabrication of larger production-size ingots.

If your organization requires custom-made refractory alloys, ATI Wah Chang's experienced staff is ready to help. Contact us for more information on the company's alloying capabilities and support services.

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