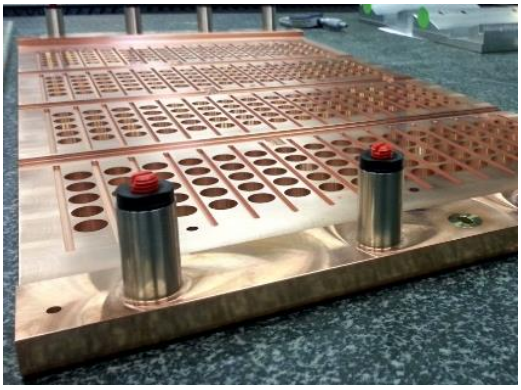
FUSION FOR ENERGY

TECHNOLOGY OFFER

Manufacturing robust and compact components subjected to very high heat loads

F4E and CECOM have developed an innovative process to manufacture robust and compact components subjected to very high heat loads. Applications in aerospace, nuclear and energy industries, more precisely for brazing-free manufactured combustion chambers and components, are considered.



The technology

Used to manufacture an innovative water-cooled grid for ITER, the technology is based on galvanic deposition of copper. It has been implemented not only to close leak tight copper channels, but also heterogeneous joints to connect stainless steel manifolds to feed water into them. By means of this process, any components subjected to intense heat load or that need to be cooled, can be manufactured.

Preservation of all the mechanical properties of the components while reducing their weight

The main benefit of the process is that, by combining technologies of galvanic copper and nickel deposition, any deterioration of the mechanical properties in the components (internal material) is eliminated. Furthermore, the use of copper deposition as a cold method to cover the channels allows reducing the overall weight of the pieces significantly.

Industrialisable process applicable to multiple metals

This process is applicable also to other metals as well as for joining different metals, like for instance copper and stainless steel. CECOM has developed also other methods to join heterogeneous material using mechanical preparation and copper or nickel deposition. Finally, the process has been optimized for having better repeatability (e.g in comparision with the the brazing) and it is ready for industrial production for applications in aerospace and energy.

Collaboration opportunities

The technology is available through collaborations to develop assemblies based on this “cold-welding” technique, that relies on higher mechanical strength of materials thermally unaltered.

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