

Frittage et nitruration liquide des comprimés de l'alliage Fe-Ni-Mo-Al-Ti

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Abstract : One of the disadvantages of sintered materials obtained by solid phase sintering is the open residual porosity which limits the application of certain treatments such as thermochemical treatments in a liquid medium. Therefore, nitriding is not recommended for sintered materials because of risks of infiltration of the saturating liquid medium in the open porosity generating in the long term internal corrosion of the structure. Our study presents the results of the nitriding of sintered Fe-20% Ni-1% Mo-X% Al-Y% Ti alloy tablets (where X and Y vary from 1 to 6 and 1 to 4 respectively). . During sintering, these compositions cause the formation of an aluminum-based liquid phase which favors the partial elimination of the open porosity. Our interest was in the first place, in the study of the influence of aluminum additions on the character of diffusion, as well as on the evolution of porosity and on the formation of the structure of the sinter, and second, on the repercussions of nitriding on this new structure. The results of the micrographic analysis revealed a clear evolution of the character of the porosity, with a tendency to the elimination of open pores. Structurally, sintering has resulted in an array of intermetallics as a result of the interaction of liquid aluminum with other solid particles. The microhardness profiles showed that despite the selective nature of the diffusion of nitrogen and carbon during cyanidation, the saturation was at heart, with the formation of islands of AlN, TiC (C, N) . As for the properties, the appearance of Fe-Al, Ni-Al and Ti-Al intermetallics during sintering gave the material good resistance to hot oxidation. Cyanidation modifies the oxidation behavior of the material and significantly improves its hardness.

Keywords : composite, Sintering, Porosity, liquid nitriding, Oxidation