

**(19-020) - Wetting behaviour of silver-based braze alloys onto silicon nitride substrates for oil well drill bits application**

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Metal-ceramic interfaces are present in tricone drill bits for oil well drilling operations. The combination of actions of cutting, crushing and erosion of rocks results in the degradation of tricone drill bits. The improvement of metal-ceramic interfaces can minimize some of most common failures presented in tricone drill bits, optimizing their lifetime and so reducing drilling metric cost. In direct brazing the formation of a liquid phase occurs promoting the contact and the reaction of the pairs. Therefore, the wetting phenomena play an essential role in the production of metal/ceramic interfaces. Silicon nitride is a hard ceramic, thermal and chemically stable in highly corrosive environments, and so can be an interesting material for hard ceramic inserts application on drill bits. In this work, silver based brazing alloys were melted onto silicon nitride substrates under high vacuum. Better results were found for the silicon nitride system using a reactive braze alloy.

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