Study of Properties of Aluminum Wires Treated with Nanoparticles of MoB2

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The need for a material of lower cost, for electronic packaging as the main use, was the main motivation for the investigation. This objective brought to the question “Is it possible to make a composite at a lower cost with the same or better properties than aluminum-diamond?”. The hypothesis was that the low coefficient of thermal expansion of MoB2 would make it possible to produce a lower cost composite with the same properties of the commercial one, aluminum-diamond. The purpose of the research was to fabricate a nanocomposite of Al/MoB2 and mix it with melt aluminum to make aluminum wires with different percentages of MoB2. Different tests such as the following were done to analyze the properties of the wires: XRD characterization, a micrograph with a Nikon® optical microscope, bending properties test according to norm ASTM 1350-H19, electrical resistivity tests, linear coefficient of thermal expansion test and Ultimate Tensile Strength tests with an Instron®. The preliminary results showed an improvement of the properties of Al/MoB2 such as the decrease of the linear coefficient of thermal expansion when compared with pure aluminum, even though it did not reach the high properties of aluminum-diamond. Therefore it is still possible to increase the amount of MoB2 in the aluminum matrix and repeat the tests already done to determine if the characteristics of the wires can be improved.

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