Study of anodic film's surface and hardness on A356 aluminium alloys

Alexandra Musza [a,b], Dávid Ugi [b], Ádám Vida[a], Nguyen Quang Chinh [b]

[a]*Department of Industrial Materials Technology, Production Division, Bay Zoltán Nonprofit Ltd. for Applied Research, H-1116 Budapest, Kondorfa str. 1*

[b]*Department of Materials Physics, Eötvös University, H 1117 Budapest, Pázmány Péter sétány 1/A, Hungary*

[a] *alexandra.musza@bayzoltan.hu*

In the automotive industry, there is a growing demand for weight reduction, one means of which is to replace iron-based alloys with lighter elements such as e.g. aluminum or its alloys. Although the density of aluminum is significantly lower than that of ferrous alloys, unfortunately its mechanical strength and hardness are also lower, the latter can be increased by electrochemical means (e.g. by anodizing).

The aim of the present research is to characterize the layers of an optimally prepared sample formed by anodizing with material testing tools. The main alloying elements of the A356 alloy are silicon and magnesium, but it also contains 0.2% iron and 0.1% zinc. The surface of the sample can be well characterized by the value of the surface roughness before and after anodization. By microscopic examination of the cross-sectional abrasion of the sample, we can get an initial picture of the most basic properties of the formed layer. Extending these tests with hardness measurement and profilometric analysis, the sample preparation parameters that allow the creation of layers with the most suitable adhesion and satisfactory properties can be determined. At the end of our research, we want to find out whether components subject to heavy wear can be replaced with alternatives made from these alloys.

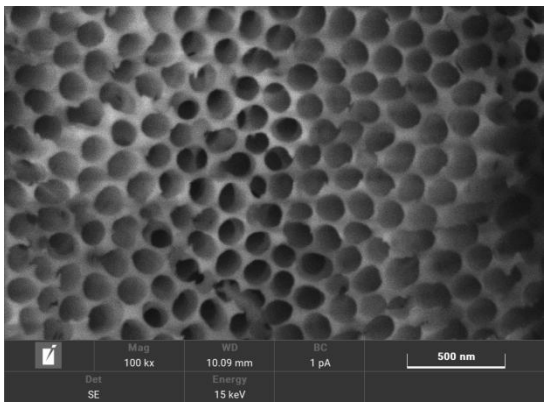

Figure : Electronmicrograph from anodized sample surface at magnitude of 100.000x