Special Characteristics of Ingot Castings and Extrusion Ingots Produced at the Qatalum Aluminum Production Site

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The quality of raw materials used for primary aluminium production vary depending on the location they originate from. Consequently, the level of trace elements found in the raw materials varies from location to location and so does the chemistry of the final product. While the effect of trace elements is difficult to quantify, they may have a significant impact on both process ability and the properties of the final product. The raw materials used in the aluminium production at the Qatalum facility in Qatar might have quantities of some chemical elements above that seen at other production facilities around the world. Therefore, the present project aims at (i) discovering the effects of aluminium alloy constituent calcium (Ca) and phosphorus (P) on segregation in ingot castings and (ii) revealing the influence of trace elements such as vanadium (V) and nickel (Ni) on extrusion performance and properties. Typical ingot castings from Qatalum have been characterized and compared to castings from the Hydro Sunndal production facility in Norway. Moreover, extrusions from billets cast at Qatalum have been subjected to a series of analyses with respect to the influence of the trace elements mentioned above. Again, for comparison extrusions of billets cast at Hydro Sunndal will be used for reference.In achieving these goals a series of advanced techniques in metallography and elemental analysis as well as mechanical tests were employed to reveal the characteristics of the Qatalum special alloy compositions and benchmark castings and extrusion profiles microstructures and properties against fully controlled reference materials.