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#### **Application of scanning electrochemical microscopy (SECM) for local characterization of AA2098-T351 surface in different conditions.**

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Aluminum alloys are commonly used in automotive and aerospace applications because of their good mechanical properties and low density. The aluminum-lithium (Al-Li) alloys are a class of Al-alloys which have some superior properties, such as lower densities than conventional ones and, for this reason, used as structural components in aircrafts. The addition of lithium aims to reduce density of the material with gains in the mechanical properties and in the specific modules, which is important for the aerostructures. However, the addition of this element usually increases localized corrosion susceptibility. The scanning electrochemical microscopy (SECM) technique can provide a good understanding about the corrosion behavior and the local reactions of this class of materials. In this work, different modes of SECM measurements were employed to characterize the AA2098-T351 surface in various conditions. The surface generation/tip collection (SG/TC) mode and competition mode were employed to study the hydrogen gas (H<sub>2</sub>) evolution and oxygen reduction, respectively, in the AA2098-T351 surface in the conditions: polished and unpolished. It was found that the main domains of H<sub>2</sub> evolution and oxygen reduction are associated with the alloy surface in the polished condition. The feedback mode of SECM was employed to characterize the electrochemical activity of the surface after immersion in a solution containing ions chloride, in order to verify the influence of the oxide layer formation over the surface in the active/passive domains due the corrosion process. The previously attacked surface revealed a much lower electrochemical activity compared with the surface in the polished condition due to the protective character of the oxide formed during immersion test.