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## A 3D approach to visualize ion diffusion in polymers using LA-ICP-MS and LIBS

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Increasing industrial demands for more capacity and faster processing speeds lead to miniaturization and weight reduction in the product development of microelectronic devices. High performance polymers like polyimides play an important role in this process due to their high thermal stability, high chemical resistance and high mechanical toughness. Therefore, they function as an insulating film, passivation layer or mechanical stress buffer in a variety of different applications. To improve the durability and reliability of electronic devices, the uptake and diffusion of corrosive species within those polymers is of utmost importance. In general, LA-ICP-MS and LIBS are powerful techniques to uncover the migration pattern of ionic species within a polymer.

In this work, we use LA-ICP-MS and LIBS to enable rapid mapping of commercial polyimide films which were exposed to various aqueous solutions containing potassium chloride and copper(II) chloride. In order to measure these three analytes, both techniques as well as a tandem approach are executed to map the exposed area. A comparison between the measurement methods is done to achieve optimum conditions for all analytes. Both, lateral mapping and depth profiling is applied to gain insight into the diffusion behaviour and obtain 3D information.

LA-ICP-MS, LIBS, diffusion, polymers

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