Recovery, characterization and purification of $LiPF_6$ extracted from lithium-ion batteries

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The growing volume of electronic waste (e-waste), particularly end-of-life (EoL) lithium-ion batteries (LIBs), poses significant environmental challenges. With EU regulations aiming for ambitious recovery rates of critical metals, such as lithium, by 2030–2031[1], the need for efficient, scalable, and environmentally friendly recycling methods of these devices is urgent.

$LiPF_6$ is currently the most used lithium salt for LIBs as an electrolyte, but it has various drawbacks regarding its stability, which usually contributes to the aging and eventually failing of the battery[2].

The purpose of this research has been to devise a repeatable recovery method of the lithium salt and, using ^{31}P NMR with the ERETIC software[3], its quantification and the identification of its decomposition byproducts contained in an extract obtained from LIBs scraps.

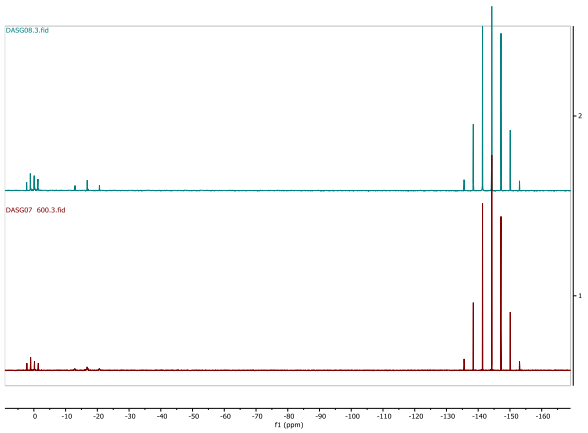

Figure 1. Two samples of $LiPF_6$ extracted from spent LIBs

Later, we will discuss a preliminary two-step purification process aiming to remove or reduce the percentage of the byproducts in the extract, with the purpose of reusing the $LiPF_6$ inside new batteries.

References

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