

Supplementary Information

Effect of the Electrolyte on the Production of Graphene Oxide by Electrochemical Exfoliation from Discharged Batteries

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Figure S1 illustrates the sequence of disassembling batteries to extract the graphite electrode. The graphite rod was carefully removed from conventional discharged AA (1.5 V) zinc-carbon batteries.



Figure S1. Disassembly sequence of the batteries to remove the graphite electrode.

The removed rods were separated and cleaned to remove excess electrolytic paste from the electrode surface with mechanical polishing and ultrapure water, thus removing any remaining chemical residues. Work carried out by Yu *et al.*¹ showed that after the graphite cleaning stage, in addition to the elements Mn and Zn (both < 1%) already present in the composition of the battery, other substances were observed, resulting in around 5% residue. The existence of these elements may be related to the purity of the graphite before the batteries were manufactured and/or after the battery's useful life. Pre-treatment began, by immersing the graphite for 24 h in solutions: (a) 0.5 mol L⁻¹ H₂SO₄; (b) 0.5 mol L⁻¹ HCl; (c) 0.5 mol L⁻¹ HNO₃. The results of the research with pre-treatment in sulfuric acid showed that there is a possibility of improving the graphite exfoliation process by more than 10%.¹

Reference

1. Yu, T. M.: *Esfoliação Eletroquímica do Grafite de Pilhas Usadas para Obtenção de Óxido de Grafeno*; MSc Dissertation, Federal University for Latin American Integration, Iguazu Falls, Brazil, 2022. [[Link](#)] accessed in April 2025

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