

O Prof. Dr. Pedro Daniel da Cunha Kemerich juntamente com um Grupo de Pesquisadores da USP, UEL e UNICENTRO teve o artigo **Evaluation of metal release from battery and electronic components in soil using SR-TXRF and EDXRF**

publicado na revista

X - Ray Spectrometry

, cujo qualis em Engenharias I é B1 e B2 em Engenharias II e Geociências. O referido artigo aborda a problemática da lixiviação de compostos químicos oriundos de componentes eletrônicos como placas de computadores, pilhas e baterias.

Evaluation of metal release from battery and electronic components in soil using SR-TXRF and EDXRF

Felipe Rodrigues dos Santos (Applied Chemistry Posgraduate program - Unicentro, Guarapuava, PR, Brazil),
Eduardo Almeida (Nuclear Instrumentation Laboratory, CENA, USP, Piracicaba, SP, Brazil),

Pedro Daniel da Cunha Kemerich

(Universidade Federal do Pampa – UNIPAMPA, Campus Caçapava do Sul, RS, Brazil),

Fábio Luiz Melquiades

(Applied Nuclear Physics Laboratory, Physics Department, UEL, Londrina, PR, Brazil)

With improper disposal of the batteries and electronic devices, potentially toxic elements can be leached, contaminating the soil, groundwater and surface water. The objective of this study was to evaluate metal release of batteries and electronic components deposited in the top of columns and tanks filled with soil, respectively, in which acid rain was simulated. The leachate solution and the soil were analyzed by SR-TXRF and benchtop EDXRF, respectively. Results indicate that batteries released K, Mn, Fe, Cu, Zn and Pb and electronic scrap released Ti, Mn, Fe, Cu, Zn and Pb. For batteries leachate test samples, a high amount of Fe, Cu, Mn, Zn and Pb have been released compared to electronic component test sample under the experimental conditions. The Fe, Cu and Pb concentrations in leachate test samples with batteries were above their CONAMA maximum permitted values (MPV) and in the leachate test samples with

e-waste only the Pb concentrations was above MPV. In batteries soil samples K, Mn and Zn presented higher concentrations, mainly at the 10 cm topsoil, ranging from 0.16 to 0.50, 0.27 to 8.67, 0.03 to 1.26, in %, respectively. The Zn-C batteries present similar behavior to the alkaline ones. The impact due to the Pb release was higher in the soil test samples with electronic components, where their concentrations ranged from 51 to 394 mg kg⁻¹, above its MPV. The X-ray fluorescence techniques employed were suitable for water and soil environmental evaluation.