Fakulta agrobiologie, potravinových a přírodních zdrojů

DOKTORSKÝ STUDIJNÍ PROGRAM/*DOCTORAL STUDY PROGRAM*

VYPSÁNÍ TÉMATU/*LISTING OF TOPIC*

Studijní program/*Study Program*: **Exploitation and Conservation of Natural Resources**

Katedra/*Department of*: **Soil Science and Soil Protection**

Školitel, email/*Supervisor, emai*l: **Doc. RNDr. Aleš Vaněk, Ph.D., vaneka@af.czu.cz**

Konzultant, email/*Co-supervisor, email*:

Forma studia/*Form of Study*: **Full_time**

Téma/*Topic*: SOLAR PANELS – A GLOBAL E-WASTE: TRACKING THE FATE AND BEHAVIOR OF EMERGING SOIL POLLUTANTS USING STABLE ISOTOPE PROXIES

Hypotézy/*Hypotheses*: The thesis aims to: (I) track the environmental stability of SPs and contaminant release from this e-waste; (II) assess the role of soil and soil factors in the degradation of SPs; (III) track the fate of major SPs-derived contaminants using stable isotopes as redox proxies.

Anotace/*Summary*: Crystalline silicon solar panels (SPs) are the most widely used type of photovoltaics worldwide, accounting for ~90% of the total market share. Beyond the general strategy of proper recycling of SPs, there is evidence of unsustainable disposal of this e-waste, including landfilling, which exposes the environment to a range of chemical hazards. Most importantly, the degradation of SPs can lead to the release of toxic trace elements, making them emerging contaminants. Questions concerning the long-term stability of SPs, their degradation potential in soil systems, and the role of soil properties in the release rate of pollutants all remain unanswered. This project uses model-based methods to assess the environmental impact of SPs, i.e. when they are landfilled – enter soils. For the first time, combined/novel isotope systems of Ag, Sb and Cu are proposed to be used as proxies to track individual post-depositional processes of major contaminants derived from SPs. These data are clearly needed to better understand the fate and/or to quantify potential hazards associated with SPs e-waste.

V/*In* Praze dne/*Date*: 21.11.2025

Podpis školitele/*Signature of the Supervisor*:

Podpis konzultanta/ *Signature of the Co-supervisor*:

Podpis vedoucího katedry/*Signature of the Head of the Department*:

Příloha/*Attachement*: Finanční plán u témat vypsaných pro prezenční formu studia/*Financial plan for topics listed for full-time study*