

Environmentally Sustainable Production of Critical Metals in Tasmania: A Collaborative Multidisciplinary Initiative

Owen Missen¹, Yamila Cajal¹, David Cooke¹, Ivan Belousov¹, Lejun Zhang¹, Julie Hunt¹, Sharon Fraser², Michael Roach¹, Mohammadbagher Fathi¹, Wei Hong¹, Sheree Armistead¹, Kim Beasy², Angela Santos Costa¹, Vinicius da Cruz¹, Jose Barillas Dias¹, Emrecan Yurdakul¹, Javier Gil Rodriguez¹, Nelao Naimbale¹, Christopher Allen¹, Alfredtina Appiah¹, Emmanuel Musa¹, Pratiche Mondal¹, Jane Hall-Dadson²

¹Centre for Ore Deposit and Earth Sciences (CODES), University of Tasmania, Hobart, Australia, ²School of Education, University of Tasmania, Hobart, Australia

Tasmania hosts important resources of critical and strategic metals, with: mining operations currently producing tungsten and tin; advanced exploration projects defining rare earth element and magnesium prospects; and critical metals such as cobalt identified as potential by-products from active base and ferrous metal mines, and potentially from mine wastes. To support the growth of the critical minerals industry in Tasmania and foster additional development, an extensive collaboration between academia, industry, and government organizations has been developed to provide up-to-date geological and geometallurgical data. The collaboration is funded by the Australian Government Department of Education and led by CODES, in conjunction with the School of Education at the University of Tasmania. It includes collaboration with ten industry partners, Mineral Resources Tasmania, the Tasmanian Mining Manufacturing and Energy Council, and other national and international university partners. The research includes three main components: (1) orebody knowledge and characterization of critical metals, (2) pathways to production, including minerals processing and environmental geology, and (3) education and engagement. Eleven doctoral students are being trained in the collaborative project, with most combining field research and analytical work to link the macro and micro scales of critical metal deportment. Our Education team is investigating barriers for young people entering into the mining industry, particularly focusing on Tasmania's mining-dominated but isolated west coast region.

The three components of the project have allowed the team to produce research outcomes via our innovative multidisciplinary collaboration between natural and social scientists. Our research results have implications for exploration targeting and processing of critical metals and on regional community engagement and barriers to STEM education, both in Tasmania and globally. We highly recommend that future multidisciplinary projects collaborate with departments such as education and social sciences to expand the reach and impact of geoscience research.