

Young Scientist Battery Manifesto Topic2: Sustainability and Circular Economy

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Batteries play a central role in enabling a sustainable economy, but their full potential can only be realized through a holistic approach to the entire battery value chain. The Young Scientist Battery Manifesto emphasizes the necessity of a circular economy for lithium-ion batteries, spanning sustainable mining, circular design, eco-efficient production, efficient waste management, reuse, refurbishment, and advanced recycling. It highlights Europe's urgent need to strengthen material security through domestic mining and recycling while reducing reliance on external powers. Research and policy coordination are required to advance circular design principles, digital product passports, and innovative production methods with lower energy and carbon footprints. Moreover, improved collection systems, intelligent diagnostics for second-life applications, and robust standards for reuse and recycling are key to creating a regenerative battery economy. Integrating life cycle considerations from design to end-of-life will not only reduce environmental impact but also enhance Europe's economic independence and enable leadership in sustainable battery technologies.