

Principles of materials circular economy

*Seeram Ramakrishna*¹, *Rajan Jose*^{2 3}

¹ Center for Nanotechnology & Sustainability, National University of Singapore, Singapore, Singapore

² Center for Advanced Intelligent Materials, Universiti Malaysia Pahang, 26300 Kuantan, Malaysia

³ Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, 26300 Kuantan, Malaysia

ABSTRACT

Material sourcing, processing, usage, and end-use management play a substantial role in present-day life; however, the sustainability concerns call for adaptation of “materials circular economy” to provide the materials’ share of the solutions to the existential threats. This Matter of Opinion puts together ten principles of materials circular economy as a guide for the materials community at large, including researchers, engineers, designers, manufacturers, businesses, and policy makers, to review and update. We hope that these ten principles and associated future editions will be helpful to eliminate the materials-related existential threats.

KEYWORDS

Materials; Products

REFERENCES

1. Ramakrishna, S., Pervaiz, M., Tjong, J., Ghisellini, P., and Sain, M.M. (2022). Lowcarbon materials: Genesis, Thoughts, Case Study, and Perspectives. *Circ.Econ.Sust.* 2, 649–664. <https://doi.org/10.1007/s43615-021-00135-9>.
2. https://www.silicones.eu/wp-content/uploads/2019/05/SIL_exec-summary_en.pdf, accessed on.
3. Elhacham, E., Ben-Uri, L., Grozovski, J., BarOn, Y.M., and Milo, R. (2020). Global humanmade mass exceeds all living biomass. *Nature* 588, 442–444. <https://doi.org/10.1038/s41586-020-3010-5>.