

A cleaner/greener technology does not mean healthy to humans and nature

Yoshiyasu Takefuji

Michael Funk et al. wrote an article entitled "A cleaner, greener future for chemicals" (1). In 2019 Nobel Prize in Chemistry was awarded for the development of lithium-ion batteries that have led to portable electronic devices that are rechargeable virtually anywhere on the planet. Although the lithium-ion batteries do not contain mercury, lead, cadmium, or any other material deemed to be hazardous, heating the batteries releases toxic gases (2,3,4). The toxic gases include carbon dioxide (CO<sub>2</sub>), hydrogen fluoride (HF), phosphoryl fluoride (POF<sub>3</sub>), carbon monoxide (CO), and others. Lithium-ion batteries have been used in our smart phones so that the toxic gases may be hazardous in special situations. Lithium batteries are generally safe and unlikely to malfunction as long as there are no defects and the batteries are not damaged. When lithium batteries fail to operate safely, they may present a fire or explosion hazard. More than 25,000 overheating or fire incidents – involving more than 400 types of lithium battery-powered products – occurred between January 2012 and July 2017, according to the Consumer Product Safety Commission's Status Report on High Energy Density Batteries Project, published on Feb. 12, 2018 (5). Since the lithium-ion batteries are relatively small so that we have been facing the recycling problems (6).

References:

1. Michael Funk et al. "A cleaner, greener future for chemicals," Science 24 Jan 2020: Vol. 367, Issue 6476, pp. 378-379
2. Yu Qiao, Polymer Testing, <https://doi.org/10.1016/j.polymertesting.2019.106175>
3. David Sturk et al., Analysis of Li-Ion Battery Gases Vented in an Inert Atmosphere Thermal Test Chamber, Batteries 2019, 5(3), 61; <https://doi.org/10.3390/batteries5030061>
4. James C Thomas et al., Consequence Analysis of Li-Ion Battery Thermal Runaway Events with Chemical Equilibrium Analyses, 2018 NASA Aerospace Battery Workshop, Huntsville, AL
5. <https://www.safetyandhealthmagazine.com/articles/18041-osha-issues-safety-bulletin-on-hazards-of-lithium-batteries-lithium-powered-devices>
6. Lead-Acid vs Lithium-Ion Batteries: Which is More Harmful to the Environment,

<https://www.techtimes.com/articles/246965/20200120/lead-acid-and-lithium-ion-batteries-effects-to-the-environment.htm>