

This information is intended to be responsive to issues raised during the hearing.

Two key issues that were raised were the manufacturing components of LEDs and where they were manufactured.

LED Composition

LEDs can be thought of as tiny semiconductors. A 2012 study (S. Lim et. al., 2012) found 20 substances contained in an LED. The substances with the greatest amounts were aluminum, copper, iron, and zinc. Cobalt was not found to be an LED substance in this study. The remaining substances were found in trace amounts.

Below is a pertinent table from the study.

Table 1: Results of Total Threshold Limit Concentrations (TTL) Tests; and Results of Toxicity Characteristics Leaching Procedure (TCLP) Tests (S. Lim et. al., 2012)

substance	TTL threshold	incandescent bulb	CFL bulb	LED bulb
aluminum	N/A	40,100	31,700	947,000
antimony	500	ND	117	123
arsenic	500	ND	2.6	ND
barium	10000	4.1	17.8	364
cerium	N/A	9.4	9.6	7.8
chromium	500 (VI); 2500 (III)	5.8	1.1	120
copper	2500	942	111,000	31,600
gadolinium	N/A	ND	0.6	0.1
gallium	N/A	7.9	6.0	108
gold	N/A	ND	ND	2.2
indium	N/A	ND	ND	ND
iron	N/A	372	12,800	12,300
lead	1000	6.9	3860	16.7
mercury	20	0.1	18.3	0.4
nickel	2000	188	120	151
phosphorus	N/A	ND	222	127
silver	500	16.2	12.2	159
tungsten	N/A	24.4	1.4	1.2
yttrium	N/A	0.6	2540	1.7
zinc	5000	320	34,500	4540

^aValues in bold indicate that the TTL results exceed the regulatory limit. The unit of measurement is mg/kg. Note that mercury vapor in the CFL lamp can be released to the air during the grinding process. N/A: Not applicable. ND: Not detected.

This chart indicates that LEDs contain much fewer harmful elements than the mercury-based fluorescent bulbs.

Manufacturing of Fluorescent and LEDs

The kinds of fluorescent light bulbs phased out by HB 2531 ("general-purpose fluorescents") are no longer manufactured in the United States. The manufacturing of these fluorescents moved overseas years ago. U.S. jobs would not be impacted by phasing out these fluorescent light bulbs.

LEDs, while also primarily manufactured overseas, do see some domestic manufacturing and jobs. There are even a few Oregon-based LED manufacturers including NW LED Lights, LED Trail, and Kelvix Lighting

Let me know if you have additional questions or if you are aware of any information you think would be helpful to the committee.

Thanks very much.

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