

The Mysterious Polymath

A Story of What's Inside an LCD TV Screen
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“Two thieves were caught selling stolen, *Samsing* LCD TV screens on *Ubay!*,” the CBC announcer screeched, as Milo Gibson turned on his own LCD TV. “Having stolen one-hundred units, they would have made \$30,000, as TV screens are the most expensive segment of our household televisions! The robbers were put in prison-.”

The TV suddenly froze. It blacked out while in unison with the doorbell ringing! “Ugh, valuable TV time wasted,” Milo complained, as he got off his slouchy sofa, and headed for the door. Absent-mindedly thinking of his pending homework, he opened it.

“Hello,” greeted a man wearing peculiar clothes. He was wearing a bathrobe with ski goggles, a pair of slippers, (though it’s January!) and a magician’s hat?

“Do I know you?”

“Did *you* know an LCD TV screen contains over 6 million pixels!”

“Uh, that’s nice sir, but-.”

“LCD screens consume 25% less power than CRT screens!”

“Why are you bombarding me with fa-.”

“LED displays are actually LCD!”

“ENOUGH!,” Milo shouted as the door shut. *There go my manners*, he thought.

Minutes later, Milo decided to plummet on his couch to check his texts. Suddenly, the TV rebooted! The news played. However, there was an awfully familiar voice taking the place of the usual announcer.

“... And that’s why LCD screens aren’t affected by magnets!”

You again, Milo thought, unplugging the TV.

Phew, that was annoying.

However, Milo was more curious about LCD TV screens than ever before, and entered the video-sharing platform *Metube*, typed in “*what’s inside an LCD TV*”, and pressed enter. The platform autocorrected *inside* to *inside*, and search results appeared. Milo clicked the topmost option. “The three primary non-renewable minerals of an LCD screen,” the voice began, “are Silicon Dioxide, (Quartz Sand), Indite (Indium) and Apatite (Phosphorus). Let’s dig deep into Quartz Sand!” *What energy!* Milo was hooked.

“Also called silica/silica sand, it is the most significant component of the Earth’s crust. Earth, having a great abundance of sand, makes it easy to find and relatively easy to process. Being the primary ore source of silicon, it’s used to make glass, filter and process wastewater, and even supports plant growth.

Quartz Sand is found in coastal areas without active volcanoes, including Siesta Key Beach. Quartz Sand is mined by *The Quartz Corporation* and *Sibelco Ltd*. On land or along rivers, it’s often dug up with backhoes, shovels and even bare hands.

Near coastlines, miners will utilize dredging boats or suction pumps. It typically undergoes a range of size reduction through crushers. Even further size reduction is usually done with rod and ball mills to separate Quartz Sand from other minerals.

Approximately, \$283 million worth of Quartz Sand yearly, is profited by Canada.”

Interesting, Milo thought.

“Next, we have Indium, which is predominantly recovered from residues left from the electrolytic refining of Zinc, from the mineral Sphalerite.

However, some Indium can be found in its pure form but occurs in only a few minerals, such as indite. Indium is three times as abundant as silver or mercury. Indium is the softest metal that isn't an alkali metal and is predominantly used to make indium tin dioxide.

Indium is used to dope germanium, to construct transistors, rectifiers, photoconductors, thermistors, and can be used to make mirrors that are as reflective as silver mirrors, while not tarnishing as quickly! There are about 15k tonnes of Indium in the Earth's crust, of which $\frac{2}{3}$ are mined in China. Indium in Canada is typically mined at East Kemptville, Nova Scotia. Some companies that mine Indium are *Adex Mining* and *Indium Corporation of America*.”

“Now folks, the last dominant element in LCD TV screens, Phosphorus. It's clear, flammable and toxic, as it emits light due to chemiluminescence with the help of oxygen. It's mostly used for fertilizers and is the key element in growing plants. It's used in making pesticides and safety matches, along with LEDs, baking powder, bombs, etc.

About 70% of total Phosphate reserves are in Morocco and are obtained from the mineral Apatite. Phosphate is mined by *The Mosaic Company* and *Nutrien LTD*. Phosphate rock is mined mostly by surface methods using bucket wheel excavators and draglines for large deposits, and power shovels or earthmovers for smaller deposits. White phosphorus is made by heating phosphate rock in the presence of carbon and

silica in a furnace. This produces phosphorus as a vapour, which is then collected underwater. Red phosphorus is made by heating white phosphorus to about 250°C in the absence of air. And there you have it! Quartz, Indium and Phosphorus are all important components of an LCD screen. Don't forget to lik-."

Milo paused the video. He took a moment to recollect all the facts. Unexpectedly, his laptop switched to CBC News, and...

"LCDs don't suffer from screen burns!"

"Ugh."

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