Safe Handling of Sodium Iodide [NaI(Tl)] Crystal Material

A sodium iodide [NaI(Tl)] crystal is activated by the addition of a very low concentration of thallium iodide (TlI). We asked our law firm to give us an opinion whether this product should be treated as a hazardous material for labeling purposes. A quote from their response dated November 29, 1984, follows. “We have examined the Dangerous Goods Regulations effective 1 January 1985, as promulgated by the International Air Transport Association and the Hazardous Materials Regulations promulgated by the U.S. Department of Transportation, Research and Special Programs Administration, Materials Transportation Bureau. It is our opinion, based upon our review of these materials, that your products containing sodium iodide crystals with traces of thallium iodide are not considered hazardous or poisonous.”

However, thallium iodide as a pure chemical is toxic. One of our suppliers tells us that amounts of more than 1 gram per person can cause death. Another supplier states the LD-50 is 28 milligrams per kilogram body weight. On a more practical basis, there is the personnel hazard that exists from a damaged, and possibly leaking, crystal container. A thallium-activated sodium iodide crystal on average is 99.8% sodium iodide and 0.2% thallium iodide. The weight of a 2-inch diameter by 0.25 inch thick NaI(Tl) crystal is 47.24 grams including 0.094 grams of TlI. Casual contact with the small fraction of this material which might leak from a damaged container is not a serious hazard.

If a container is damaged, handle with disposable rubber gloves. Dispose of the detector materials according to local and federal regulations at an approved site. If you are unable to do so, please call Saint-Gobain Crystal’s customer service department for a Return Materials Authorization (RMA) number so the damaged detector can be returned to us for proper disposal.

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