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10Be AMS MEASUREMENTS AND CHRONIC BERYLLIUM DISEASE (CBD)

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Beryllium and Be compounds, especially inhalation of very small particles or fumes, are known to be extremely toxic materials. Although the occupations with the highest risk are likely Be mining and machining, AMS researchers who process and measure 10Be are also at risk. Although most 10Be researchers are aware of the toxicity of Be, many nonetheless do not take the risk seriously. I have experienced circumstances that have brought home in a personal manner this risk. I hope this experience will galvanize all researchers who handle Be compounds to remain vigilant regarding the risks of Be. There are two types of beryllium diseases, acute and chronic beryllium disease (CBD), but the former is now rare and not important for AMS researchers. Patients with CBD experience several symptoms including shortness of breath, cough, night sweats, fatigue, chest pain, and weight loss. Symptoms may develop within months to 30 - 40 years after exposure to Be. Since CBD is an immune system response that is only people have beryllium sensitization (allergy to Be) develop symptoms, it is important to get a diagnosis of beryllium sensitization first.

Immune sensitization to beryllium can be detected by a blood test technique: beryllium lymphocyte proliferation test (BeLPT), which measures the white blood cells' reaction to Be. BeLPT is a complicated, time-consuming, and relatively expensive test. Only three laboratories, Oak Ridge Institute for Science Education (ORISE), National Jewish Health Center, and Cleveland Clinic perform the BeLPT in US (2019 update) (e.g. 1). Over 45 years, I have handled more than 150 g of BeO, perhaps giving me the dubious distinction of handling more Be, perhaps by one to two orders of magnitude, than anybody in AMS community I have known. With the help of EH&S at Lawrence Berkeley National Lab (LBNL), I have participated in the BeLPT every ~3 years. The blood samples were sent to two of above labs because it requires two abnormal results to identify beryllium sensitization. In addition, a high-resolution chest CT scan, chest x-ray, and pulmonary function test were performed.

I will describe complicated BeLPT and some suggestions / practices of prevention of beryllium disease at the meeting.

References:

1. Beryllium lymphocyte proliferation testing (BeLPT), DOE-SPEC-1142-2019.

Student Submission

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