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1987/52. Mineralogy of lead shot, Taroona Shot Tower

R. S. Bottrill

Abstract

The lead shot was found to consist of lead metal with its oxidation products litharge and cerussite, and quartz and dolerite sand. The specific gravity is anomalously low due to the shape of the pellets.

INTRODUCTION

A sample of the lead shot from the Shot Tower at Taroona was submitted by J. Hillhouse for an assessment of its lead content.

MINERALOGY

X-ray diffractometry indicated dominant lead metal with a large amount of cerussite ($PbCO_3$), litharge (PbO), minium (Pb_3O_4), quartz, and other unidentified phases.

Binocular microscopy revealed dominant grains of variably oxidised lead, sometimes with included quartz grains. Some lead is well rounded and heavily crusted with yellow, white, brown and red oxidation products. Most, however, is highly irregular, skeletal and even wirey, with slight to moderate oxidation. Other phases include quartz (sand), iron (fresh spheres to rusty flakes), dolerite, graphite, magnetite, and several unidentified materials. There would appear to be about 80% lead pellets, 10% dolerite, 5% quartz and 5% others, by volume.

The specific gravity was determined, by the water displacement method (in a measuring cylinder), to be 7.4, compared with 11.3 for pure lead, 6.6-9.2 for the oxidation products, 2.65 for quartz and about 2.7-3.0 for dolerite. The determined specific gravity is anomalously low, and is probably due to poor 'wetting' of the lead due to the irregular shapes, and perhaps some internal porosity. There would probably be more than 90 wt% lead in the sample.

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