Hydrargyrum Chloratum Compositum

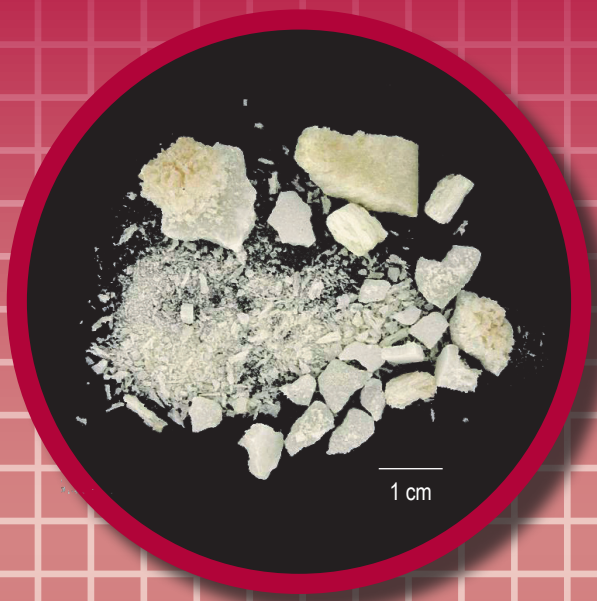

Figure 1 (i) A photograph of Hydrargyrum Chloratum Compositum in plate-shaped

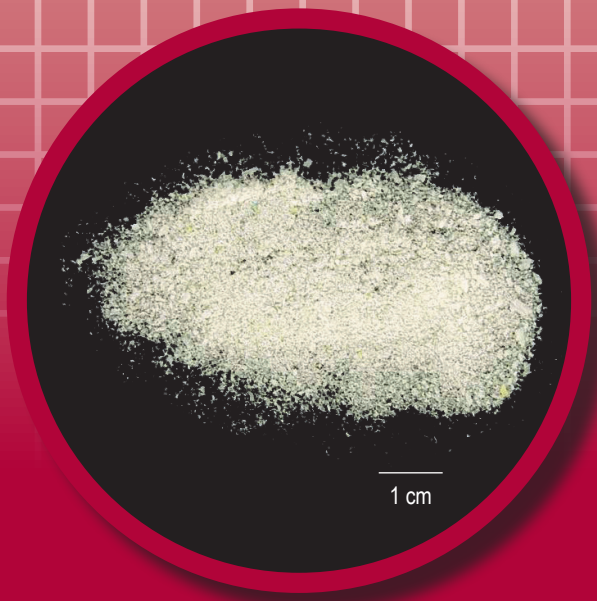

Figure 1(ii) A photograph of Hydrargyrum Chloratum Compositum in powder

1. NAMES

Official Name: Hydrargyrum Chloratum Compositum

Chinese Name: 白降丹

Chinese Phonetic Name: Baijiangdan

2. SOURCE

Hydrargyrum Chloratum Compositum is a synthetic mixture of mercurous chloride (Hg_2Cl_2) and mercuric chloride ($HgCl_2$). The mineral should be stored in a container protected from light.

3. DESCRIPTION

Plate-like aggregate. White to pale yellowish-white in colour. Thick in the middle and thin towards the edges; one side is smooth while the other side is relatively coarse; lateral side showing needle-shaped to columnar-shaped crystals, varying in length and unevenly arranged. Opaque, with pearl lustre. Heavy, texture soft and fragile. Broken powder in needle-shaped to columnae-shaped. Extremely toxic. Odourless (Fig. 1).

4. IDENTIFICATION

4.1 Microscopic Identification *(Appendix III)*

Powder

Colour white to yellowish-white. Crystals in columnar, subsquare to irregular shape, with sharp corners; colourless and transparent, dark at the edge; sometimes striations can be observed. Bright white, polychromatic or weakly polarized under the polarized microscope (Fig. 2).

4.2 Physicochemical Identification

(I) Chemical test of mercuric and mercurous salts

Procedure

(a) Weigh 0.1 g of the powdered sample and place it in a 20-mL test tube, then add 5 mL of water. Dissolve the sample in 1 drop of nitric acid (15%, w/v). Filter and transfer the filtrate to a 20-mL test tube. Add 3 mL of sodium hydroxide solution (4.3%, w/v) and mix well. Yellow precipitate can be observed.

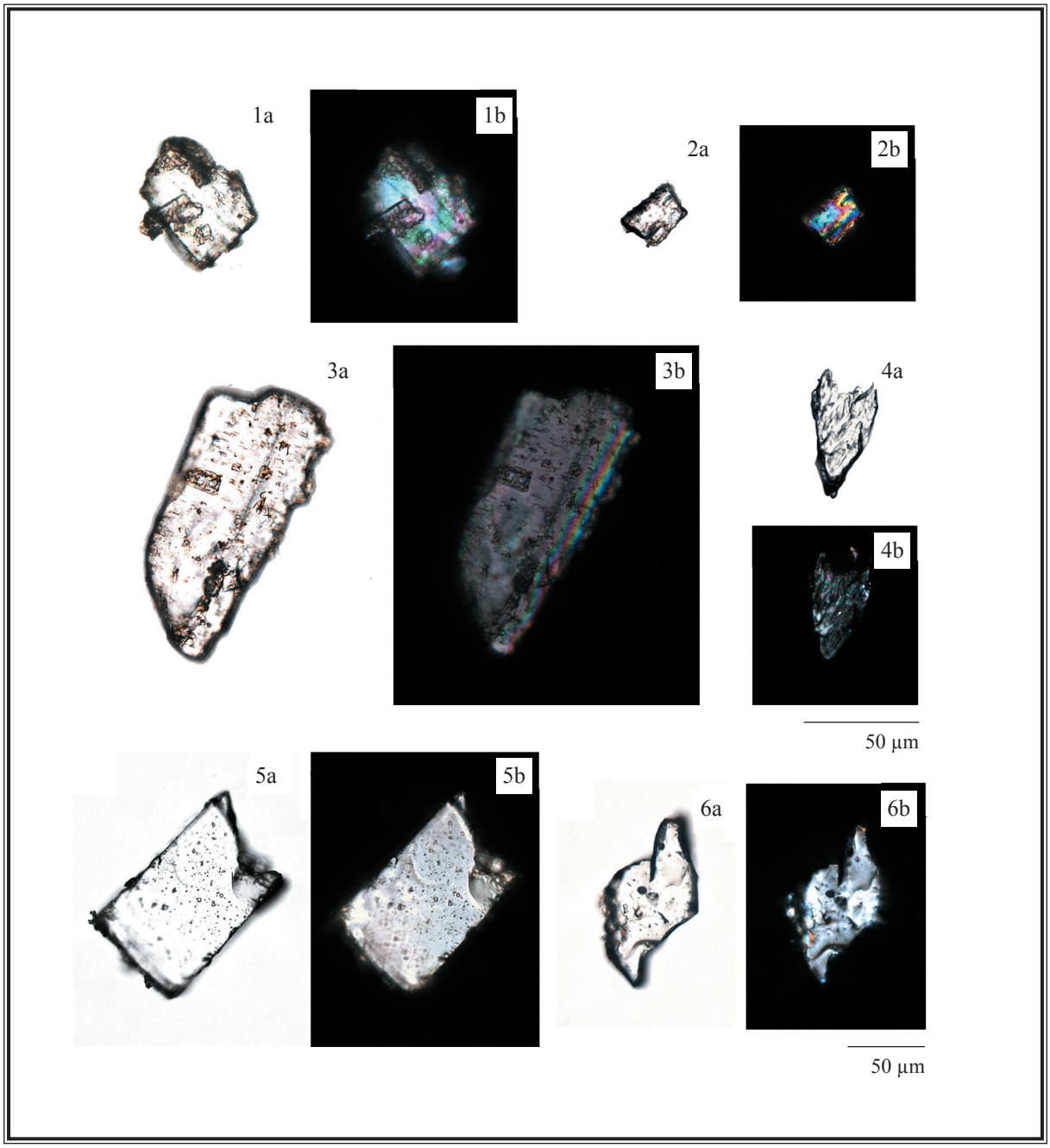

Figure 2 Microscopic features of powder of Hydrargyrum Chloratum Compositum

1,2. Subsquare crystals 4,6. Irregular shape crystals 3,5. Columnar crystals

a. Features under the light microscope b. Features under the polarized microscope

(b) Weigh 0.1 g of the powdered sample and place it in a 20-mL test tube, then add 5 mL of water. Dissolve the sample in 1 drop of nitric acid (15%, w/v). Filter and transfer the filtrate to a 20-mL test tube. Neutralize the filtrate with about 100 µL of sodium hydroxide solution (4.3%, w/v). Then, add 0.15 mL of potassium iodide solution (16.5%, w/v), scarlet precipitate can be observed. Add potassium iodide solution (16.5%, w/v) until scarlet precipitate dissolves. Add 3 mL of sodium hydroxide solution (4.3%, w/v) followed by 0.05 g of ammonium chloride and mix well, reddish-brown precipitate can be observed.

For positive identification of the mercuric salt, the sample must show the above observations. For positive identification of the mercurous salt, the sample must show the clear solution.

(II) Chemical test of mercuric chloride

Procedure

Weigh 0.1 g of the powdered sample and place it in a 20-mL test tube, then add 5 mL of water. Dissolve the sample in 1 drop of nitric acid (15%, w/v). Filter and transfer the filtrate to a 20-mL test tube. Add 10 mL of nitric acid (15%, w/v) and mix well. Add silver nitrate solution (1.7%, w/v) until white precipitate can be observed. Collect and dissolve the precipitate in 2 mL of ammonium hydroxide solution (36%, w/v). Add nitric acid (15%, w/v) until white precipitate is formed.

4.3 X-ray Powder Diffraction Pattern *(Appendix XVI)*

Carry out the method as directed in Appendix XVI.

Standard materials

Finely powdered mercurous chloride (0.5 g) and mercuric chloride (0.5 g).

Test sample

Weigh 0.5 g of finely powdered sample onto a glass slide or other appropriate holder. Press and smear uniformly the sample until a flat and dense solid surface is obtained.

System suitability requirements

Check the accuracy of the zero shift error (in 2θ) of the X-ray diffractometer by using certified materials (lanthanum hexaboride LaB_6 or other equivalent) at the beginning of analysis. Compare the 2θ values of characteristic diffraction peaks of such certified material with the X-ray Powder Diffraction (XRPD) pattern found in scientific standard database. The instrument is in good condition to use when each of these diffraction peaks of the certified material has a 2θ discrepancy less than ± 0.05º when compared to the corresponding 2θ values of the XRPD pattern found in scientific standard database.

Procedure

Separately place the glass slide containing the finely powdered standard materials and test sample onto the diffractometer platform and record the XRPD pattern. Measure the 2θ values of the diffraction peaks of the standard materials and test sample. Compare the 2θ values of the characteristic diffraction peaks of (i) mercurous chloride standard material and test sample dominant in mercurous chloride, (ii) mercuric chloride standard material and test sample dominant in mercuric chloride or (iii) both standard materials and test sample that contain a mixture of mercurous and mercuric chloride.

The 2θ values of the five characteristic diffraction peaks of Hydrargyrum Chloratum Compositum dominant in mercurous chloride and dominant in mercuric chloride are listed in Table 1 (i) and (ii) respectively. The 2θ values of the seven characteristic diffraction peaks of Hydrargyrum Chloratum Compositum containing a mixture of mercurous and mercuric chloride are listed in Table 1 (iii).

Table 1(i) The 2θ values of the five characteristic diffraction peaks of Hydrargyrum Chloratum Compositum dominant in mercurous chloride

Peak No.	2θ / °
1	21.574
2	28.187
3	32.974
4	40.274
5	43.901

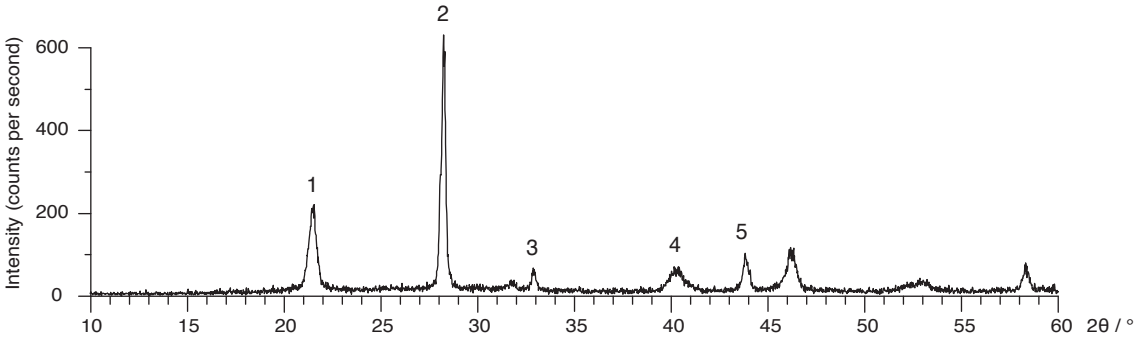

Figure 3(i) A reference XRPD pattern of Hydrargyrum Chloratum Compositum dominant in mercurous chloride

Table 1(ii) The 2θ values of the five characteristic diffraction peaks of Hydrargyrum Chloratum Compositum dominant in mercuric chloride

Peak No.	2θ / °
1	20.446
2	21.609
3	33.051
4	37.284
5	43.902

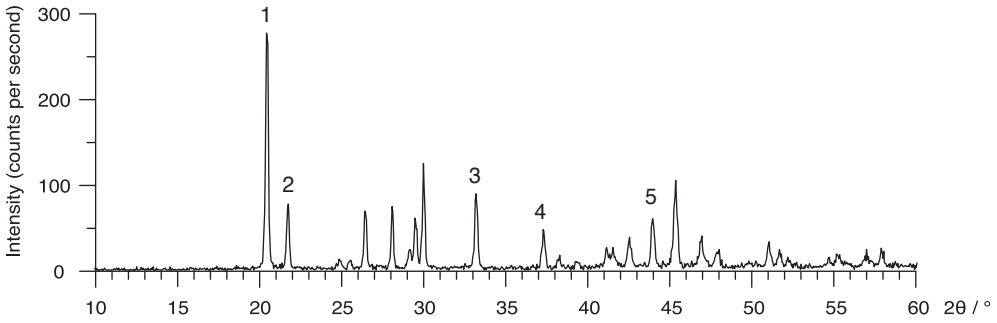

Figure 3(ii) A reference XRPD pattern of Hydrargyrum Chloratum Compositum dominant in mercuric chloride

Table 1(iii) The 2θ values of the seven characteristic diffraction peaks of Hydrargyrum Chloratum Compositum containing a mixture of mercurous and mercuric chloride

Peak No.	2θ / °
1	20.446
2	21.592
3	28.187
4	33.013
5	37.284
6	40.274
7	43.902

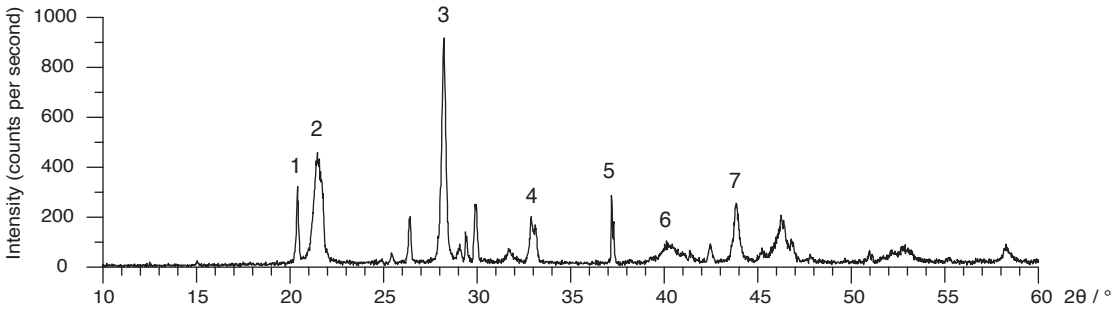

Figure 3(iii) A reference XRPD pattern of Hydrargyrum Chloratum Compositum containing a mixture of mercurous and mercuric chloride

For positive identification, the sample must give the above five characteristic diffraction peaks [Fig. 3 (i) or (ii)]; or seven characteristic diffraction peaks [Fig. 3 (iii)] each has an angular discrepancy (Δ 2θ) less than ± 0.2°, compared with the corresponding values stated in Table 1 (i), (ii) or (iii).

5. CAUTIONS

(1) Avoid prolonged use.

(2) For external use only.