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LETTER TO THE EDITOR

Removal of CaF_2 contamination

We would like to report some tests we have made concerning methods of removing CaF_2 contamination. Two methods were found, one rather slow but easy to carry out, the other quite fast but involving the use of concentrated acid.

The contamination was on silver planchettes and could not be removed by scraping, washing or immersion in an ultrasonic bath.

a) Slow method

CaF_2 is moderately soluble in solutions of ammonium salts. A contaminated planchette was placed in a solution of ammonium chloride for about 30 minutes in an ultrasonic bath, and its TL response compared with a similarly contaminated planchette treated for 30 minutes in an ultrasonic bath in distilled water. The contaminant was natural CaF_2 , MBLE type S.

The heights of peaks II and III were found to have been reduced by about 50% by the ammonium chloride treatment compared with the control. Soaking the planchette overnight was even more effective, reducing the TL from the contamination by about a factor of 10. No effect was discerned on the silver after this length of time, and we would not expect any reaction to take place with the more commonly used aluminium planchettes.

b) Fast method

CaF_2 is dissociated by concentrated sulphuric acid. A silver planchette dropped into a test tube of this acid and left there for 10 minutes was found to have been efficiently cleaned. When the planchette was tested by being given the same dose as previously (about 700 rads), no high temperature TL was found. Testing of the liquid residue for dissolved silver showed none had dissolved, and this was confirmed by weighing the planchette before and after treatment. No change in the appearance of the planchette was seen.

Application of these methods of cleaning to contaminated heater plates, although difficult, should not be impossible. In theory nichrome heater plates should not be affected by either ammonium chloride solution or concentrated sulphuric acid, but thermocouple wires and connections to the plate would probably be attacked by the acid so the slow method seems more applicable. One possible method would be to remove the heater plate and thermocouple, and soak it overnight in ammonium chloride solution.

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