

have measured the coefficient of thermal expansion of lithium ferrite over a limited temperature range, viz., 20° C-100° C. From the present investigation the value of α for lithium ferrite at 168° C is found to be 3.1×10^{-6} per °C while the value reported by Naiden and Red'kin, over the temperature range 20° C to 100° C is about 6.8×10^{-6} per °C, and that reported by Haudek¹ at 100° C is about 8.0×10^{-6} per °C. The low value obtained in the present investigation may be due to the high porosity (nearly 16%) and the difference in the conditions of preparation of the test specimens.

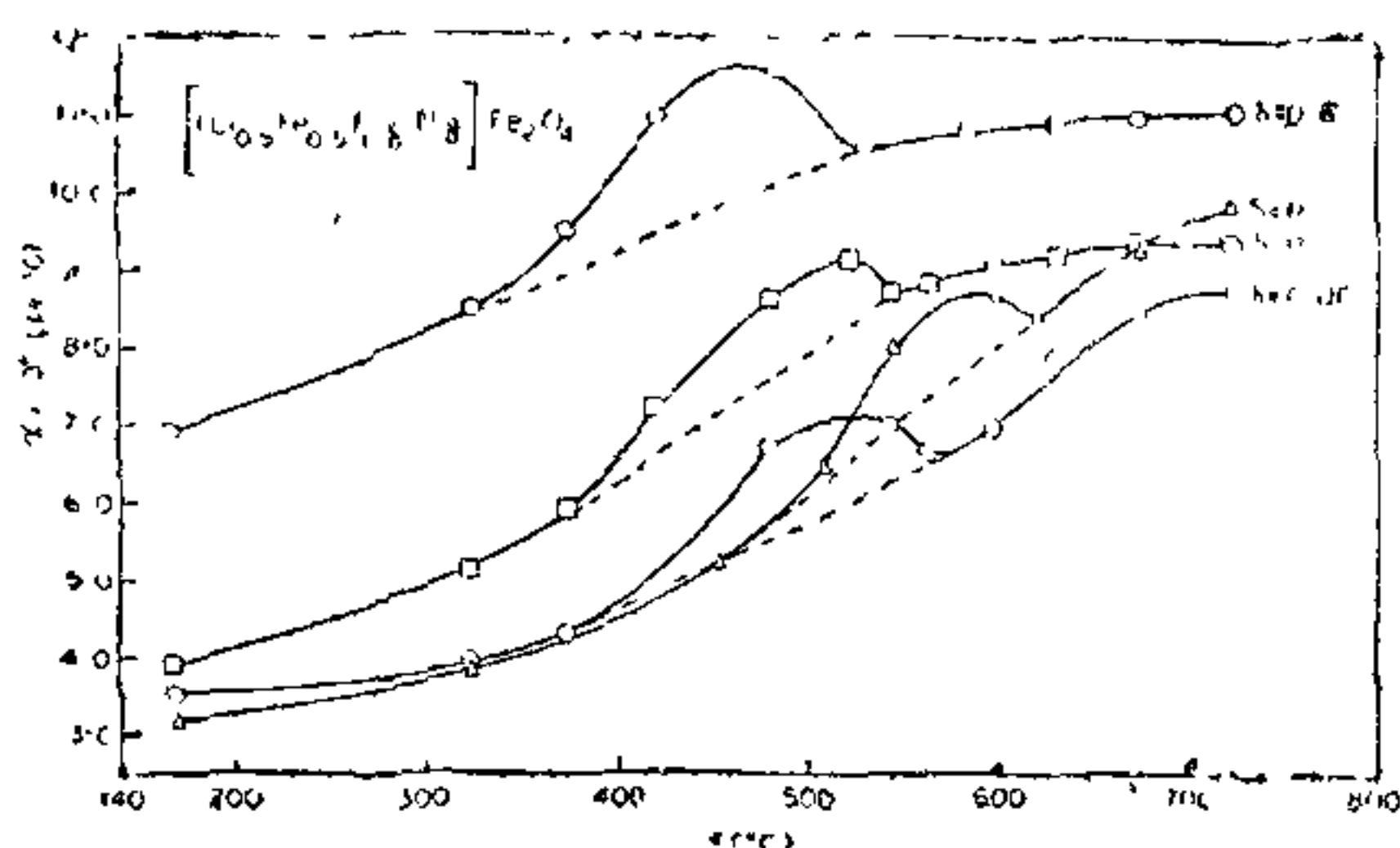


FIG. 1. Plot of coefficient of thermal expansion (α) as a function of temperature (in degree C) for lithium-nickel ferrites of different compositions.

From Fig. 1 it may be seen that for lithium ferrite, the peak occurs at 600° C, which lies in the range of values of Curie temperature reported in the literature⁴. The peak is observed to shift to the low temperature side as the nickel content is progressively increased showing thereby that the Curie temperature decreases with the increase of nickel content.

The ferrimagnetic volume change has been evaluated for the four ferrites by calculating the area between the hump and the base line indicated by dotted lines in the figure. The values of dV/V thus obtained are 0.80×10^{-4} ; 0.95×10^{-4} ; 1.11×10^{-4} and 1.88×10^{-4} for compositions with $\delta = 0$; 0.06, 0.3 and 0.6 respectively. It is also interesting to note that the value of dV/V increases with increasing nickel content.

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FLAVONES AND FURANOFLAVONES FROM THE SEED SHELLS OF *PONGAMIA GLABRA*

Pongamia glabra is one of the commonest trees of India and has been extensively studied. The seeds¹⁻⁵, roots^{6,7}, stem bark, flowers⁸, heart wood⁹ and the leaves^{10,11} have yielded a variety of flavones, chromenoflavones and furanoflavones.

The seed shells have not been examined so far. Recently, we have reported the components of the immature seeds⁵ and now we report the chemical components of the seed shells. The immature seed shells (2.5 kg) were dried, powdered and extracted with benzene in a soxhlet extractor for 72 hrs. The benzene extract was concentrated and subjected to column chromatography over silica gel. Elution of the column with pet. ether yielded waxy materials (10.0 g) with low melting points. Further elution of the column with pet. ether-benzene (9:1) gave pongamol (100 mg, m.p. 128°) identified by comparison with an authentic sample. Pet. ether-benzene (7:3) eluate yielded karanjin (200 mg), m.p. 164°. Further elution of the column with pet. ether-benzene (1:1) furnished a yellow coloured oily liquid which was not studied. Elution of the column with pet. ether-benzene (1:2) gave first desmethoxykanugin (55 mg), m.p. 146-47° (lit.⁷ m.p. 146°) followed by kanugin (60 mg), m.p. 216-17° (lit.⁷ m.p. 204°). Elution of the column with pure benzene yielded pongapin (200 mg), m.p. 191° (lit.¹ m.p. 191°). Further elution with benzene-ethyl acetate (98:2) furnished kanjone (150 mg), m.p. 190-91° (lit.¹ m.p. 191-92°). Final elution of the column with benzene-ethyl acetate (9:1) gave pinnatin (100 mg), m.p. 184-85° (lit.¹² m.p. 183-84°).

Thus the immature seed shells contain pongamol, karanjin, desmethoxykanugin, kanugin, pongapin, kanjone and pinnatin while immature seeds⁵ have karanjin, pongapin, lanceolatin-B, kanjone and isopangaflavone. Thus we find that all the components present in the seeds and seed shells have resorcinol unit except pinnatin. The shells have small amounts of desmethoxykanugin and kanugin which are the main components of the stem bark^{6,7}. Thus the seed shells have components some of which are present in the stem bark while others are present in the seeds.

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EOSIN AS A RE-CONCENTRATOR IN THE DETERMINATION OF ANTIMONY IN NATURAL WATERS BY NEUTRON ACTIVATION

Introduction

As many elements exist in natural waters at trace concentrations and they are admixed with major constituents like sodium, potassium, magnesium, calcium and chloride which interfere in the direct determination, many workers have attempted to absorb them on various precipitates such as manganese dioxide, ferric hydroxide¹, phosphates², organic precipitants, organic³ and inorganic ion exchangers. To provide a sensitive technique, neutron activation method has been applied to determine antimony in seawater in concentration of parts per billion or less, using the co-precipitation of antimony on eosin in acidic medium. The theoretical sensitivity by neutron activation for antimony is reported⁴ as 4×10^{-5} μgm based on 2.8 d ¹²²Sb and 3×10^{-6} μgm based on 60 d ¹²¹Sb for an induced activity of 40 dps for a thermal neutron flux of 5×10^{13} n/cm²/sec.

Analytical Procedure

One litre of filtered seawater was acidified to 1.5 N with concentrated HCl. Eosin (300 mg) was added

to this, stirred and kept overnight and then filtered through millipore filter paper (0.45 μ size). The precipitate was dried, packed in an aluminium foil, sealed in an aluminium can and irradiated under a neutron flux of about 10^{13} n/cm²/sec for 24 hours. The sample was cooled for 3 days and then taken for further chemical analysis.

The irradiated samples were dissolved in conc. HNO₃, 30 mg Sb carrier (Sb Cl₃ solution) added and further ashed by HNO₃ till the colourless residue was obtained. The residue was taken up in 15 ml of 6 N HCl. The solution was passed through Dowex-1 \times 8 (50–100 mesh, 6 mm \times 10 cm) column pre-equilibrated with 6 N HCl. The column was washed gradually with 5 N HCl, 15 ml of N HCl and finally with 10 ml of 9 M H₂SO₄. Sb was eluted after washing the column with 2 ml of H₂O followed by 15 ml of boiling 2 M NaOH⁵. The eluates were evaporated to dryness, adjusted to 3–4 N HCl and reduced to metallic antimony by the addition of iron powder⁶. The metal was filtered on millipore filter paper, washed twice with 0.5 N HCl, dried under 110°C and assayed for ¹²⁴Sb, using well type NaI (Ti) crystal coupled to a 512 Channel Analyser.

Aliquots of standard solution, varying between 0.1–0.2 μg , were carried out on 300 mg eosin under identical conditions and irradiated along with the sample in the reactor. The radiochemical processing of the standard was done essentially in the same way as that of sample described above. Quantitative determinations of the samples were done by comparing with this standard.

Results and Discussion

Preliminary experiments were carried out to study the specificity of eosin for Sb in presence of other nuclides using 200 ml of filtered seawater, acidified to 0.1 N with conc. HCl, spiked with known amounts of ¹²⁵Sb tracer and other tracers such as ⁹⁵Zr, ¹³³Ba, ¹⁰⁶Ru, ⁶⁵Zn, ⁸⁵Sr, ⁶⁰Co and ⁵⁵Mn. Eosin (200 mg) was added to this, stirred for 2 minutes, allowed to settle overnight and then filtered through millipore filter paper (0.45 μ size). The filter paper was transferred into counting vial and eosin dissolved in minimum volume of alcohol. The height of the liquid was adjusted to the same as that of the standard and counted. It was observed that ¹²⁵Sb was carried to significant level (65%) followed by ⁷⁵Se (18.85%) and ⁹⁵Zr (17.04%). Isotopes of Ba, Ru, Zn and Sr were carried insignificantly (less than 2%) while Co and Mn were not carried even to the detection levels.

Experiments were conducted to arrive at the optimum acidity condition for the co-precipitation of Sb on eosin. The acidity of samples was changed from 0.1 N to 4.0 N HCl. Results given in Fig. 1 show that eosin carried ¹²⁵Sb to the extent of 94% at 1.5 N and further increase of acidity did not improve the