

BENIFICIATION OF GARNETS

GARNETS are found in the mica-bearing pegmatites of Nellore district in Andhra Pradesh and similar pegmatites of Bihar-Rajasthan. Beach sands also contain some appreciable amounts of garnet. Garnets are used as abrasives and as decoration stones. When the garnet becomes completely transparent it is used as precious stone.

A. GARNET FROM NELLORE, ANDHRA PRADESH

The sample was received from M/s. Indian Biselers, Madras for beneficiation to make it useful as an abrasive. The sample analysed as follows:

<i>Constituent</i>	<i>Assay %</i>
Fe	21.70
SiO ₂	46.00
Al ₂ O ₃	18.00
Mn	5.40
CaO	3.16
TiO ₂	0.50

Examination of the sample under microscope indicated the presence of Alamandite, spessartite and andradite type of garnets while quartz and muscovite formed the gangue. Small amounts of chlorite, epidote and ilmenite were also observed. The garnets were fairly liberated at 150 mesh size. The garnet content of the sample was 75% of the ore.

Tabling tests with 65 mesh sized feed yielded a garnet concentrate of 96% purity. The coarse tailing when subjected to magnetic separation, the magnetic concentrate contained 90% pure garnet. The combined table and magnetic concentrate contained 94.8% pure garnet and 1.2% free gangue.

Magnetic separation tests with —65 mesh product yielded a magnetic concentrate of 91.1% purity containing 2.1% free gangue with 54.6% distribution in it.

Tabling and magnetic separation of the table tails at 20 mesh size yielded a combined concentrate containing 92.5% pure garnet and 0.68% free gangue with 89% distribution. Heating to 800°C and quenching tests with the garnet concentrate improved the physical appearance and toughness of the sample.

B. GARNET FROM GUDA, AJMER, RAJASTHAN

The sample was received from the State Directorate of Mining and Geology for beneficiation and use as abrasive. The sample analysed as follows:

<i>Constituent</i>	<i>Assay %</i>
Fe	27.57
SiO ₂	36.81
Al ₂ O ₃	21.33
Mn	2.94
CaO	0.43
TiO ₂	0.49

Microscopic examination indicated the presence of Alamandite and spessartite variety of garnets. The gangue minerals were micas, quartz, feldspar, ilmenite and epidote which were liberated at 150 mesh size. The garnet content in the sample was about 51%.

Tabling and magnetic separation tests after rejecting the highly magnetic ilmenite portion with sized 65 mesh feed yielded a combined concentrate containing 79.5% of garnet with 87.9% distribution. Similar tests with 100 mesh feed yielded 86.3% pure garnet concentrate with 86.1% garnet recovery in it.

References

1. Beneficiation of low grade garnet sample from Nellore, Andhra Pradesh. (NML/IR/137/58) — P K Sinha, B L Sengupta & P I A Narayanan.
2. Beneficiation of a low grade garnet from Guda Area, Ajmer, Rajasthan. (NML/IR/205/61) — P K Sinha, G P Mathur & P I A Narayanan.