Beneficiation of the Petroleum Coke Fines - An improvement in the selectivity of separation

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VISWANATHAN and Nayak[1] benef ciated petroleum coke fines by the combination process of heavy media separation and flotation and obtained a blended concentrate containing 0.15% ash with a recovery of 90.25%. It was suggested to improve the grade and recovery of the blended concentrate by the combined process at a size cut of 30 mesh instead of at 22 mesh, and results are indicated in Table I to III.

TABLE I

Effect of Sodium Silicate on the flotation of —30 mesh fraction of coke

Frother : Terpineol 0.0625 Kg/tonne pH : 11.4
Initial ash content in the feed : 6.01%

Sodium Silicate Kg/tonne	% yield	% Elementary ash of concentrate
—	88 8	0.38
0.5	89.6	0.38
1.0	88.8	0.41
1.5	88.6	0.42
2.0	88.8	0 37

Table I indicates the flotation results on —30 mesh fraction of coke using sodium silicate as depressant for silica to improve the selectivity of separation. In the earlier investigation[1] on the —22 mesh fraction, as part of the coke was found in the tailings, the experiments were repeated to confirm the earlier findings. The results do not show any improvement in the selectivity of separation in the presence of sodium silicate.

TABLE II

Effect of pH on the flotation of -30 mash fraction of coke

Frother : Terpineol 0.0625 Kg/tonne
Ash content of feed : 6.01%

pH		% yield	% Elementary ash of concentrate
Rougher	Cleaner		
11.4	11.4	88.8	0.38
10.0	10.0	89.2	0.37
8.0	8.0	89.6	0.37
5.0	5.0	85.2	0.23
11.4	5.0	88.4	0.23

Earlier, it was observed that flotation experiments in the natural or acid pH showed improvement in the grade of the concentrate and the results on -30 mesh fraction are shown in Table II. It is observed that with decreased pH, the grade of the concentrate improved from 0.38% total ash to 0.23% total ash. But the recovery decreased from

TABLE III

Combined Heavy Media Separation and Flotation

Process	Feed size	Weight %	% Elementary Ash in feed	% yield	% Elementary ash in concentrate	Resultant % ash after blending	Resultant % yield after blending
Heavy Media Separation	+30 mesh	61.2	0.71	99.2	0.04	0.109	95.01
Flotation	−38 mesh	30.8	6.01	88.4	0.23		

88.8% to 85.2, when the pH was lowered from 11.4 to 5.0. Thus, to improve both the recovery and the grade, the rougher flotation was conducted at pH 11.4 and the cleaner flotation at pH 5.0. This gave an yield of 88.4% with a total ash content of 0.23%. This concentrate was blended with the concentrate obtained from heavy media separation of the +30 mesh fraction as shown in Table III. The resultant ash of the blended concentrate was as low as 0.11% and the resultant yield was 95%, thereby confirming the earlier predications by Viswanathan and Nayak[1].

REFERENCES

1. G. Viswanathan, and U. B., Nayak. "Beneficiation of petroleum coke fines-Part II" *J, Electro. Chem. Society. India*, 29-3 (1980), 189-193.