Oil spill identification. Comments

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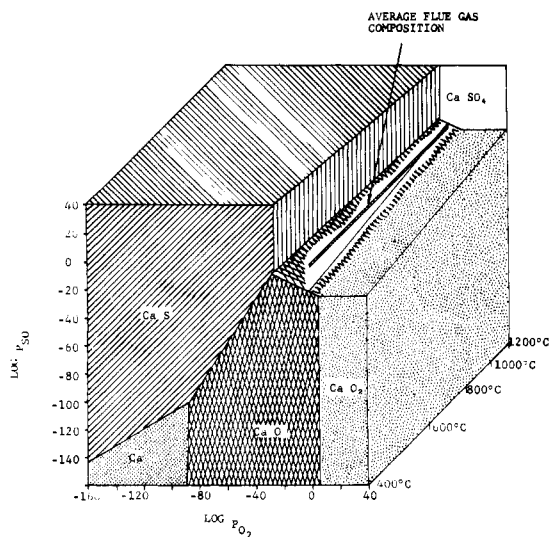**45** PUBLICATIONS   **791** CITATIONS

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Figure 6. Three-dimensional predominance area diagram for Ca–S–O system between 400°C and 1200°C

The temperature range of 1150°C is therefore the upper beneficial point for limestone injection processes. Since sulfites are not stable, their potential formation temperatures may be taken from Figures 1 and 2. Whether sulfite is found depends on the disproportionation and oxidation kinetics.

Summary

Thermodynamic properties have been collected or estimated for the $Mg-SO_2-O_2$ and $Ca-SO_2-O_2$ systems. Predominance area diagrams were constructed that explain the decomposition of $MgSO_3$ and $CaSO_3$.

It was shown that $MgSO_3$ decomposes to $MgO + SO_2$ at about 360°C as a result of slow disproportionation kinetics. The greater stability of $CaSO_3$ results in the fact that disproportionation kinetics become significant below the decomposition temperature of about 1000°C.

In the oxidizing atmosphere of normal power plant flue gases, MgO is thermodynamically capable of sorbing SO_2 to form $MgSO_4$ below 770–850°C. CaO is thermodynamically capable of sorbing SO_2 below 1150°C.

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CORRESPONDENCE

Oil Spill Identification

SIR: With regard to the paper "Oil Spill Identification with Microencapsulated Compounds Suitable for Electron Capture," by B. L. Mitchell, P. G. Simmonds, and F. H. Shair [*Environ. Sci. Technol.*, **7** (2), 121–4 (1973)], I would like to make a few comments.

First of all, I was under the impression that the concept of "active tagging" had died a quiet death after the original study by Melpar ("Oil Tagging System Study," MELPAR, 7700 Arlington Blvd., Falls Church, Va., 22046, for FWPCA-DI-Contract No. 14-12-500, May 1970, 116 pp).

In the present paper, the authors suggest that "tagging" densities of 100 particles/cm³ would be adequate for identification purposes. Considering the particles used in the paper, of 30-μ diameter, and density of approximately 1 g/cc, at a "tagging" density of 100 particles/cc and a cost of $100 per pound, we would get:

$$30\,\mu \text{ sphere} = 1.41 \times 10^{-8} \text{ cm}^3$$

$$@ \ 1\,\text{g/cc} = 1.41 \times 10^{-8} \text{ grams}$$

$$@ \ 100 \text{ particles/cc oil} = 1.41 \times 10^{-3} \text{ g/l}.$$

To "tag" a 100,000-ton tanker cargo would require 282 lb. of particles, at a nominal cost of $28,200.

In 1967 ("Waterborne Commerce of the U.S.—1967," Department of the Army, U.S. Corps of Engineers) 547,523,000 short tons of petroleum products were handled by 29 major U.S. ports. To "tag" this quantity of material, as would be required by the present paper, would require 1.9 million lb of microcapsules, at a cost of $190 million. Surely the petroleum traffic of 1973 is substantially greater than that of 1967, and we are talking in the neighborhood of a quarter of a billion dollars. This doesn't account for the many transfers of ownership of a cargo, and the retagging that would be necessary. It doesn't include one penny for labor, and it doesn't count the traffic in European ports, Asian ports, and so forth.

In the normal course of events following an oil spill of some magnitude, the number of suspects is very small. A modicum of common sense, plus a little analytical chemistry and a tad of physical oceanography is quite sufficient to eliminate the innocent parties among the suspects.

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