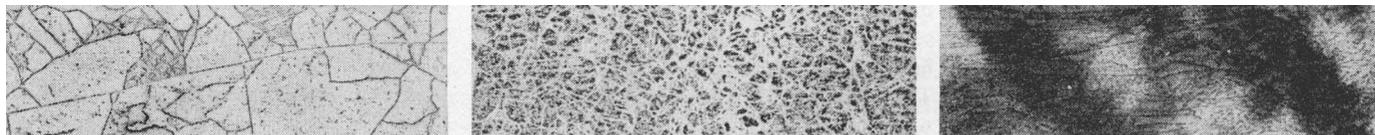


The tritium tells

Courtesy of Aluminum Company of America, which, in a paper in *Nucleonics* this April that describes this technique for precipitating tritium to delineate defect structures in solids, says, "Eastman Kodak Company 1 x 3 in. Autoradiographic No-Screen nuclear plates are employed exclusively," which is a kind and probably useful remark to make publicly. It certainly justifies our offering free reprints of their paper on request to Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y.

Zone-refined aluminum ($\times 6.5$). Only the continuous diagonal grain boundary was visible until tritium precipitated where vacancies have condensed . . .

. . . whereas after severe strain and annealing, vacancies migrate out of the cell boundaries and no longer collect tritium . . .

. . . but the tritium sure shows the dislocations piled up at slip bands of an aluminum tensile specimen.

Opium and europium

The core of the following message is simply that *Distillation Products Industries, Rochester 3, N. Y.* (Division of Eastman Kodak Company) stands ready, willing, able, and anxious to supply professionally prepared persons with any of a vast array of compounds, as detailed in "Eastman Organic Chemicals List No. 43," obtainable on request.

Many years ago it was a practice, when investigating the possibility that a victim had been drugged, to test the contents of suspicious vials with Marme's Reagent. This threw down a yellowish-white precipitate with salts of alkaloids.



Papaver somniferum, the opium poppy

Opium was known to be rich in alkaloids. They were defined as organic substances of alkaline nature. As time went on, fences were erected against this sweeping generality. Not mere alkalinity *per se* but precipitation by certain inorganic "alkaloidal reagents" was required to qualify as an alkaloid. (Concepts can shrink by swallowing their tails.) One such was apparently devised

by somebody named Marme from KI and CdI_2 . We doubt he knew why a precipitate formed by this concoction correlates with the dream world. (Neither do we, but we have to appear more knowledgeable.)

When a request for Marme's Reagent was received recently, we consulted an old chemical dictionary to find out what it was. Then we put a 1963 orientation on the matter.

In 1963 chemists can't afford to make their own reagents unless they happen to be in the reagents business, which we are. So we made Marme's Reagent, but we don't think of it that way. We offer it as a dry compound named *Potassium Iodocadmiate* (EASTMAN 8814). We think of it not as $\text{CdI}_2 \cdot 2\text{KI}$ but as $\text{K}_2[\text{CdI}_4]$. We see that cadmium ion with its four hybridized orbitals (from the 5s and the three 5p orbitals) coordinating to the four iodides, and we see that $[\text{CdI}_4]^-$ ion forming its precipitate in response to the electron-hunger of the heterocyclic nitrogen that gives the "alkaloids" their alkalinity. We look around a little and note that while Marme's name is little heard any more his ion is still talked about for identifying amines, imines, and heterocyclic N's in general, judging from an excellent review of chelometric quantitative organic analysis in *Chimie Analytique*, 43, 449 (1961). We also note that EASTMAN Organic Chemical No. 8814 is not very organic, but it does not upset us.



The coordinate-bond chemistry arising in those hybridized orbitals is now leaping the walls of its old temple, the analytical laboratory. Suddenly there is

a lot more to be said about fluorescent chelates than that they are useful for the determination of something or other. Let us merely record that

1) it has not escaped the notice of the Kodak Research Laboratories (which are strongly optically oriented) that the rare earth ions in general and Eu^{+3} in particular exhibit very sharp fluorescence lines because the 4f subshell involved is well shielded by the 5s and 5p subshells

2) this fluorescence leaves the ion in a state from which it drops so quickly to ground state that the jump-terminating level remains thinly populated

3) here is the kind of setup wherein the stimulated emission of laser action can compete successfully against the spontaneous transitions of fluorescence and absorption

4) the lifetime of the upper state is not too short to achieve a good inversion and not too long to retain the inversion while waiting for action to commence

5) chelating the rare earth ions shields them from influences that might prematurely discharge the inversion

6) the ligand of the chelate absorbs over a broad u-v band and passes the energy along from its own metastable triplet states to excite the 4f levels of the rare earth ion

7) *Tris(1-phenyl-1,3-butanediono)europium* is now EASTMAN 8989, *Tris[4,4,4-trifluoro-1-(2-thienyl)-1,3-butanediono]europium* is EASTMAN 8990, and *Tris(1-phenyl-1,3-butanediono)cerium* is EASTMAN 8629

and 8) anybody finding himself in a state of personal excitation over any ligand-lanthanide combination (except Pm) has but to name it and he may find we have a little on hand.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science