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To: R. Ferguson Date: September 9, 1988

From: D. Leyden

Subject: Potential for use of Circular Dichroism as an On-Line Monitor for Investigations of Membrane Separation of Nicotine.

In a conversation with Jeff Seeman concerning the investigations of nicotine recovery using membrane technology, he mentioned the need for a continuous on-line monitor for the studies. I reported that, other than difficulties in locating a suitable high pressure cell for the ART process, all else was very successful in our use of circular dichroism (CD) as a monitor. Nicotine has three CD peaks; one is a strong, negative peak at approximately 270 nm. The intensity of these bands is proportional to concentration, and their precise location to is influenced by such properties as protonation of the nicotine (pH of the solution). Therefore, both quantitative and qualitative information are available. In SCF CO_2 with an extremely high background absorbance resulting from waxes, the detection limit is approximately 5 PPM. We have demonstrated linearity to approximately 700 PPM. Tony Howell has used the JASCO 600 we obtained so intensively for ART studies on his one-liter system that we have not been able to do analytical experiments for almost three weeks. Water has a UV cut-off at approximately 205 nm in a 10 mm cell, so there should be no problem with the use of aqueous solutions.

If you and/or Jeff would like to discuss these possibilities further, please let me know. I think there is an excellent chance that CD would be of considerable benefit to the investigations. The instrumentation is expensive, but provides considerable information about chiral compounds. One gets a reasonably good UV spectrophotometer as well because of the way in which CD is measured.

cc: R. Fenner
J. Seeman