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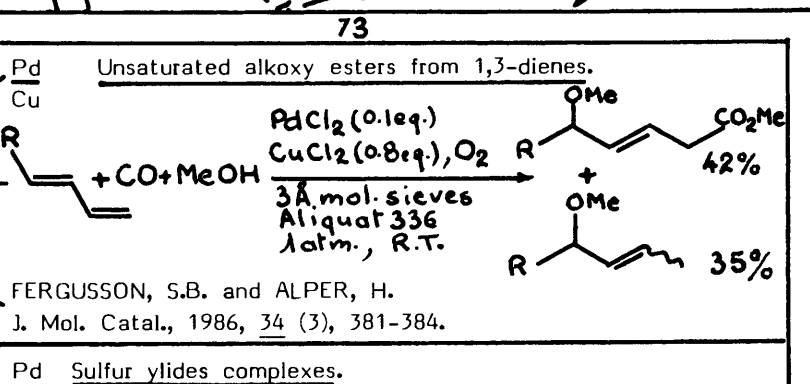
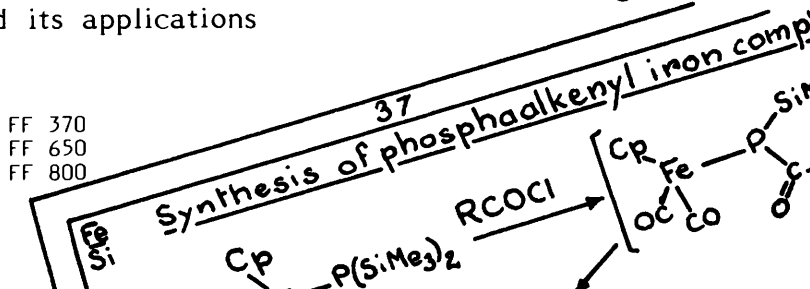
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JOHN JEYES LECTURE

The Environmental Chemistry of Radioactive Waste Disposal

by John R. Duffield and David R. Williams
Dept. of Applied Chemistry, UWIST

Over the past forty years there has been a revolution in the way in which man fulfils his energy requirements. In this period we have moved from a predominantly fossil-fuel based power economy to one in which nuclear fission plays an increasingly significant role. This transition has placed new and potentially very serious stresses on the environment and associated ecosystems. This review considers the environmental chemistry problems that the disposal of radioactive waste has generated and how they might be tackled.

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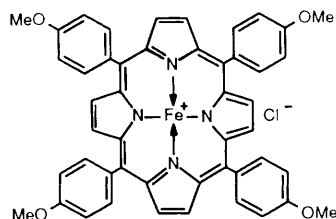


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Iron Porphine

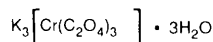


Tetrakis(4-methoxyphenyl)porphine iron(III) chloride reacts with *tert*-butyl hydroperoxide to give a novel isoporphyrin cation,¹ or with a solution of Li₂S to give a new, low-spin five-coordinate iron(III) complex with an axial hydrosulfido ligand.²

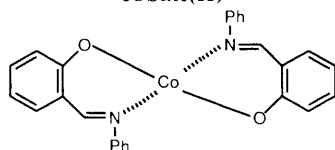
(1) Gold, A. *et al. Inorg. Chem.* **1984**, *23*, 2932. (2) English, D.R. *et al. J. Am. Chem. Soc.* **1984**, *106*, 7258.

30,303-8 5,10,15,20-Tetrakis(4-methoxyphenyl)-21*H*,23*H*-porphine iron(III) chloride 100mg \$19.65; 500mg \$65.50

Dichroic Salt



31,100-6 Potassium chromium(III) oxalate trihydrate 5g \$23.50; 25g \$90.00

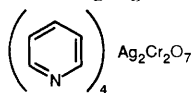
N,N'-Bis(salicylidene)dianilino-cobalt(II)

Crosslinking catalyst for polyesters and epoxy resins which can be hot or cold cured.¹ The resulting polyester compounds have a higher degree of crosslinking, elasticity and tensile strength than compounds accelerated by cobalt naphthenate.²

(1) Matskevich, T.N. *et al. Dokl. Akad. Nauk SSSR* **1977**, *235*, 358; *Chem. Abstr.* **1977**, *87*, 136774j. (2) Matskevich, T.N. *et al. ibid.* **1980**, *251*, 145; *Chem. Abstr.* **1980**, *93*, 72794c.

30,741-6 *N,N'*-Bis(salicylidene)dianilino-cobalt(II), 98% 1g \$18.75; 5g \$62.50

Oxidizing Agent

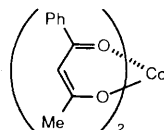


Tetrakis(pyridine)silver dichromate is used for the conversion of benzylic and allylic alcohols to their corresponding carbonyl complexes. It is a neutral, stable, nonhygroscopic and light-stable oxidizing agent which can be used in a variety of solvents such as water, pyridine, benzene, acetone and acetonitrile.

Firouzabadi, H.; Sardarian, A.; Gharibi, H. *Synth. Commun.* **1984**, *14*, 89.

31,788-8 Tetrakis(pyridine)silver dichromate 10g \$18.00; 50g \$60.00

Cobalt(II) Benzoylacetone



Catalyst for the oxidation of 3,5-di-*tert*-butylcatechol to 3,5-di-*tert*-butyl-*o*-benzoquinone, which can be alkylated by 1-bromoadamantane to form the corresponding 2-(1-adamantyl)-1,3-dione.²

(1) Tsuruya, S.; Yana, S.-i.; Masai, M. *Inorg. Chem.* **1986**, *25*, 141. (2) Gonzalez, A. *et al. Tetrahedron Lett.* **1985**, *26*, 3735.

31,688-1 Cobalt(II) benzoylacetone 5g \$15.00; 25g \$50.00

Cerium(IV) Sulfate

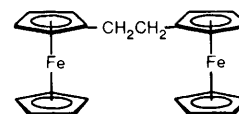


Sulfuric acid solutions of cerium(IV) sulfate are used in the ruthenium(III) chloride catalyzed oxidation of cycloalkanol to the corresponding open-chain dialdehydes^{1,2} and in the oxidation of catechol to *o*-benzoquinone.³

(1) Tandon, P.K. *et al. Z. Phys. Chemie, Leipzig* **1984**, *265*, 609; *Chem. Abstr.* **1984**, *101*, 90173g. (2) Tandon, P.K.; Krishna, B. *Kinet. Katal.* **1985**, *26*, 607; *Chem. Abstr.* **1986**, *104*, 33701y. (3) Brockhaus, R. *Liebigs Ann. Chem.* **1968**, *712*, 214.

30,594-4 Cerium(IV) sulfate, 0.25*N* solution in 2*N* sulfuric acid 250ml \$11.00; 1l \$29.00

Ferrocene Dimer

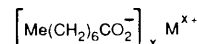


1,2-Diferrocenylethane is oxidized by bis(triphenylsilyl) chromate(VI) to 1,2-diferrocenylglyoxal,¹ a starting material for the synthesis of 1,2-terferrocene via the intermediates 3,4-diferrocenyl-4-hydroxy-2-cyclopenten-1-one, 3,4-diferrocenyl-2-cyclopenten-1-one and 1,2-diferrocenylcyclopentadiene ferrocene dimers.²

(1) Holeček, J.; Handlír, K.; Nádvořník, M. *J. Prakt. Chem.* **1983**, *325*, 341. (2) Goldberg, S.I.; Breland, J.G. *J. Org. Chem.* **1971**, *36*, 1499.

31,690-3 1,2-Diferrocenylethane, 98% 5g \$19.50; 25g \$85.00

Octanoic Acid Salts



1 M = La, x = 3
2 M = Ni, x = 2

30,695-9 Octanoic acid, lanthanum(III) salt (1) 1g \$8.20; 5g \$30.00

30,999-0 Octanoic acid, nickel(II) salt hydrate, 98% (2) 5g \$16.50; 25g \$55.00

Fluorinating Agent



Potassium fluoride on calcium fluoride is an effective alternative to phase-transfer catalysis for promoting the efficient and mild fluorination of various organic bromides and chlorides, primarily in solvents such as acetonitrile and sulfolane, but occasionally neat.

Product isolation is routine and yields are considerably improved over those obtained with conventional fluorinating agents.

Clark, J.H.; Hyde, A.J.; Smith, D.K. *Chem. Commun.* **1986**, 791. Ichihara, J. *et al. ibid.* **1986**, 793.

31,663-6 Potassium fluoride, 20 wt % on calcium fluoride 25g \$11.50 100g \$30.00



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