

PHOTODEBORONATION OF FERROCENEBORONIC ACID AND OF
PYRIDINEBORONIC ACIDS

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As an extension of our studies on aromatic photosubstitution-reactions ¹ the possibility of photosubstitution in ferrocene derivatives has been explored. The photochemistry of substituted ferrocene derivatives has been investigated by a number of workers ², but to our knowledge no simple photosubstitution at the ferrocene nucleus has been realised. It has now been found that ferrocene boronic acid in protic media (methanol) upon irradiation with light of wavelengths above 380 nm (glowing bulb) yields ferrocene and borate ester (or boric acid). No decomposition products (ferrous or ferric ions) could be detected. The reaction is accelerated by acidification (10^{-2} mol H_2SO_4 in methanol). In methanol with 10^{-2} KOH no photo-reaction is observed under the same conditions.

Photodeboronation is also found with pyridineboronic acids ³. In this case neutral and alkaline media favour photodeboronation to give pyridine and boric acid (or borate ions) and this may be an S_N1 reaction type.

The difference between the two cases is possibly related to the fact that the ferrocene molecule may react at carbon as an electron donating system whereas with pyridine the carbon atoms are strongly electron-accepting (nitro-benzeneboronic acid ³ is found to behave photochemically like the pyridine boronic acids).

References

1. Cf. E. Havinga, H.E. Kronenberg, Pure and Appl. Chem. **16**, 137 (1968)
2. Cf. A.N. Nesmeyanov, Pure and Appl. Chem. **17**, 211 (1968)
3. F.C. Fischer, Thesis Leiden (1969)