

# **Intrinsic Electronic Spectrum of Cryogenically Prepared Protoporphyrin IX Ions in Vacuo – Deprotonation-Induced Stark Shifts**

## **Electronic Supplementary Information: Animations of Key Vibrational Modes**

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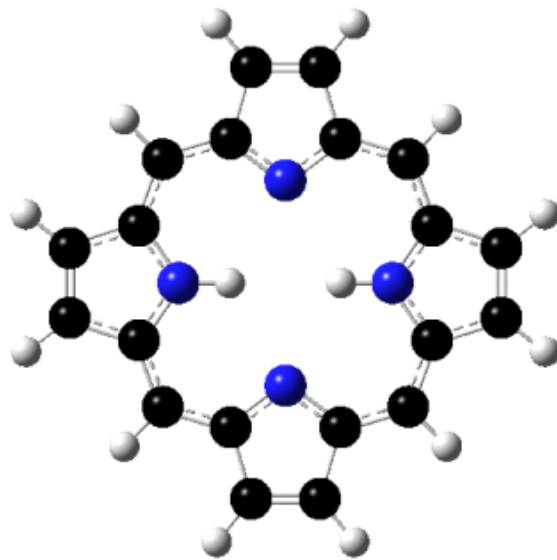
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<sup>2</sup>Department of Chemistry, University of Colorado, Boulder, CO 80309, USA.

**Note: To see animations, use presentation mode!**

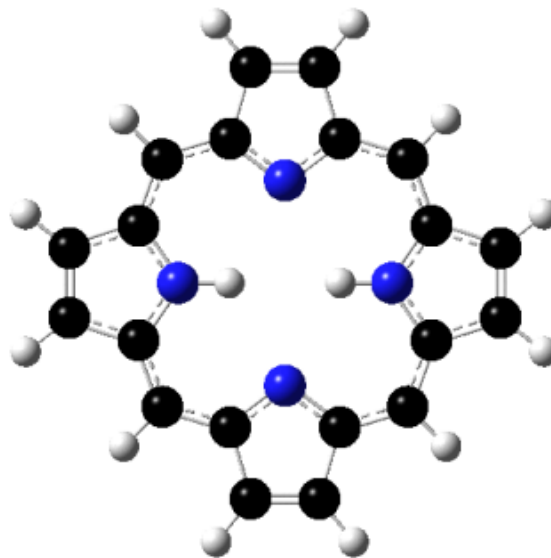
# Porphine Modes

$\nu_7 : 152.84 \text{ cm}^{-1}$



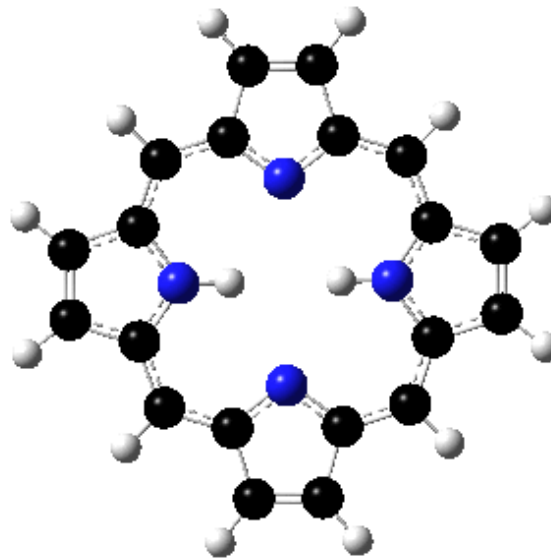
# Porphine Modes

$\nu_{13} : 311.28 \text{ cm}^{-1}$



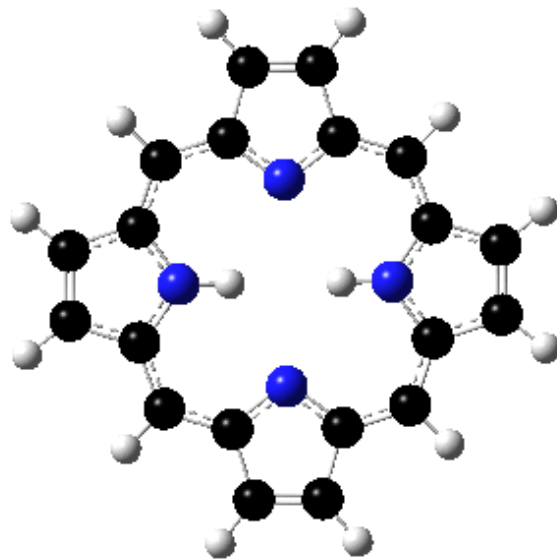
# Porphine Modes

$\nu_{33} : 733.57 \text{ cm}^{-1}$



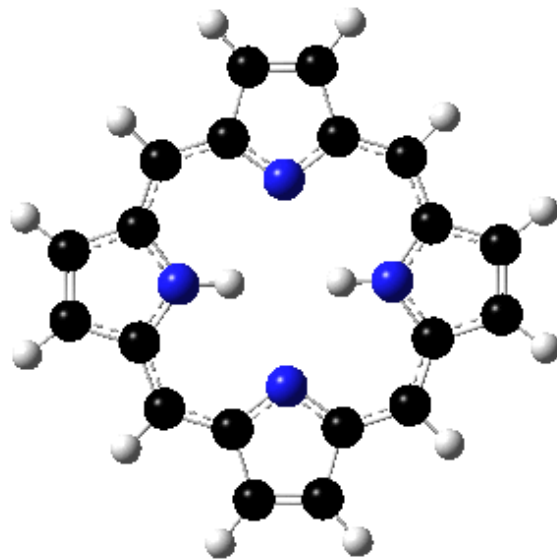
# Porphine Modes

$\nu_{41} : 799.02 \text{ cm}^{-1}$



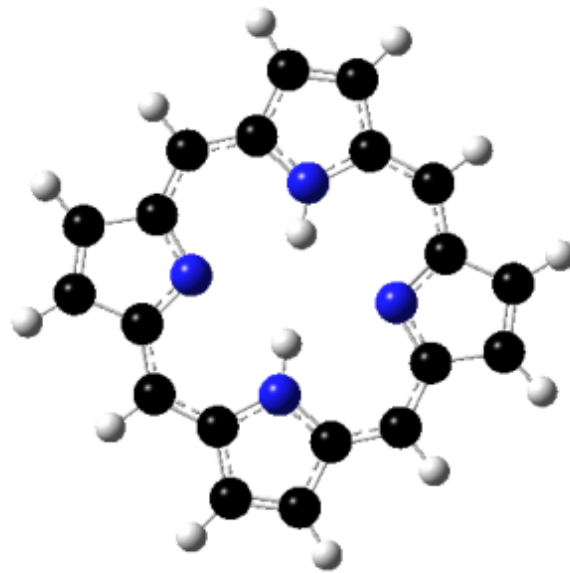
# Porphine Modes

$\nu_{53} : 977.64 \text{ cm}^{-1}$



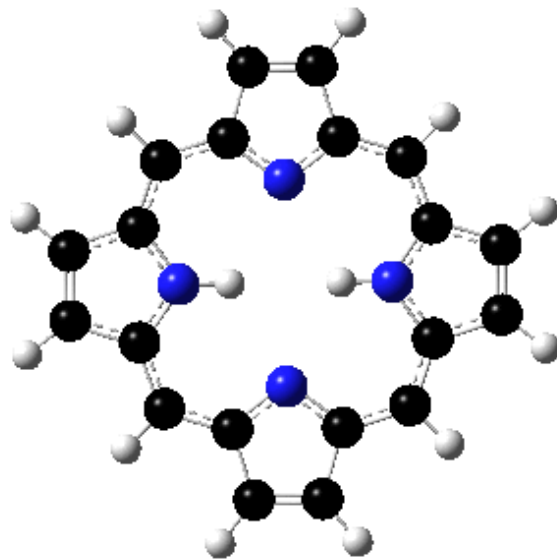
# Porphine Modes

$\nu_{61} : 1095.49 \text{ cm}^{-1}$



# Porphine Modes

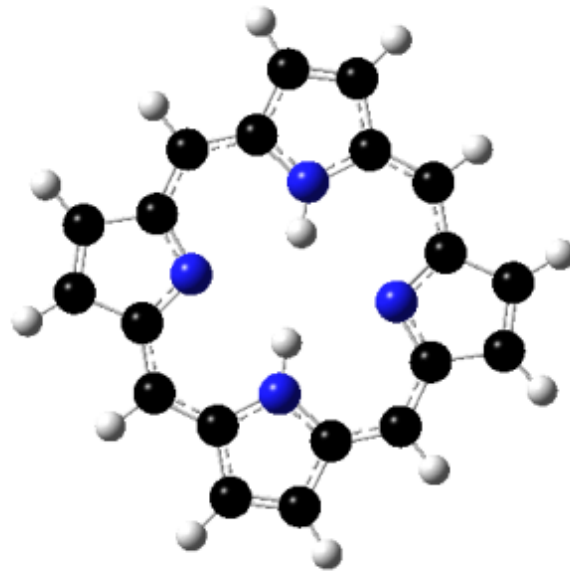
$\nu_{68} : 1209.41 \text{ cm}^{-1}$





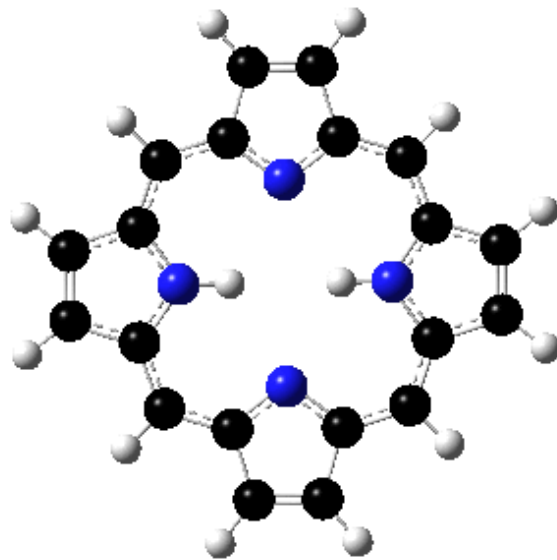
# Porphine Modes

$\nu_{70} : 1278.77 \text{ cm}^{-1}$



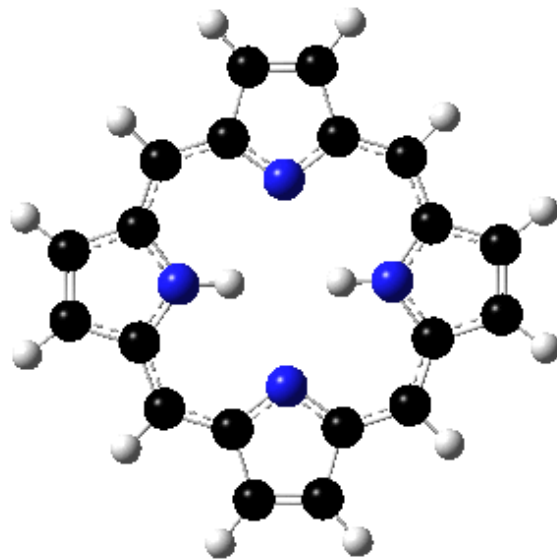
# Porphine Modes

$\nu_{75} : 1390.96 \text{ cm}^{-1}$



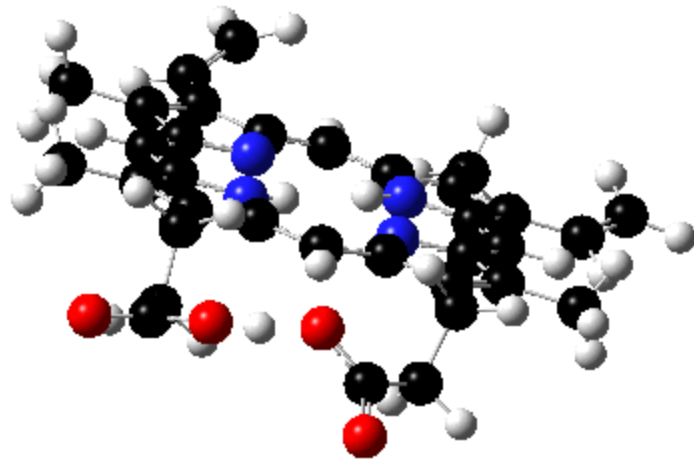
# Porphine Modes

$\nu_{91} : 1640.94 \text{ cm}^{-1}$



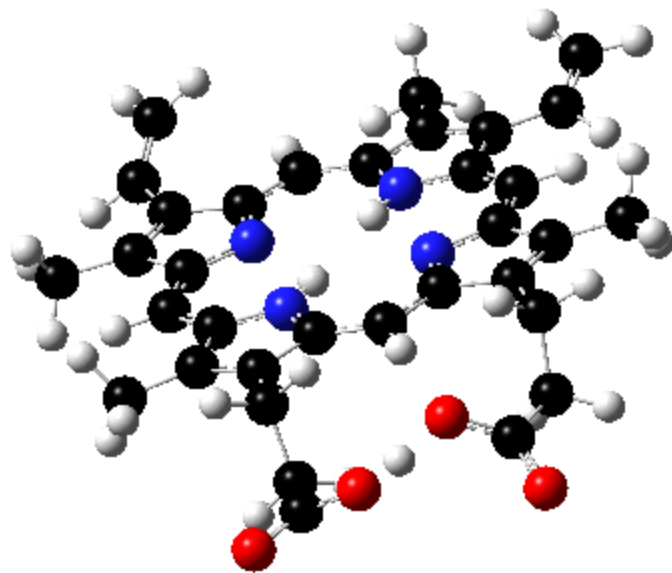
# Protoporphyrin IX Modes

$\nu_1 : 19.81 \text{ cm}^{-1}$



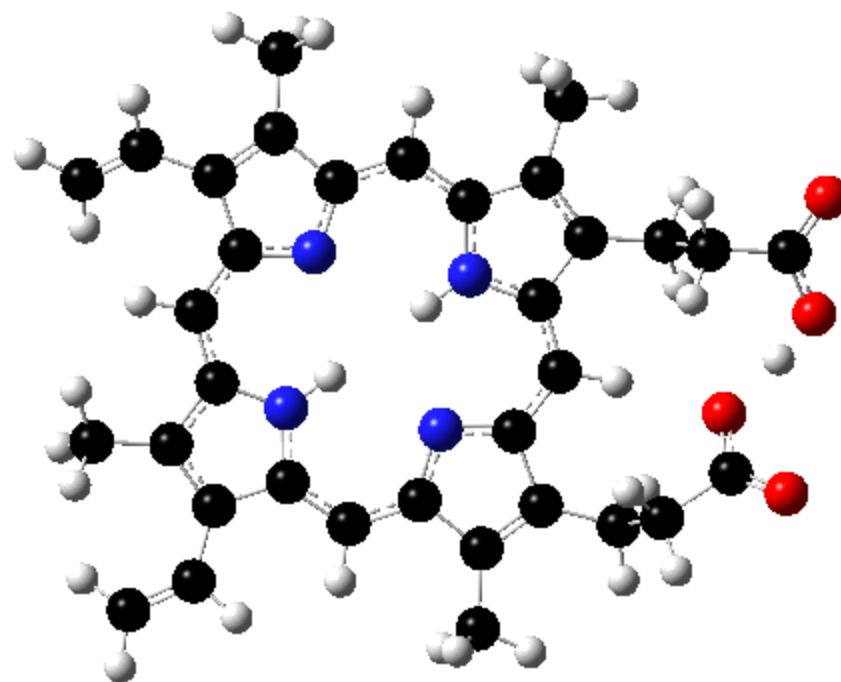
# Protoporphyrin IX Modes

$\nu_{17} : 115.60 \text{ cm}^{-1}$



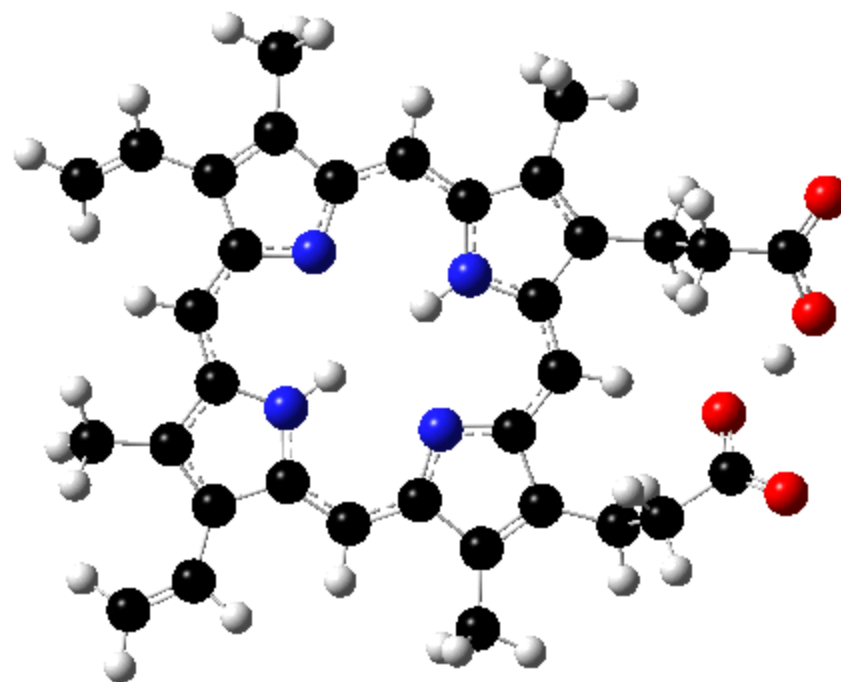
# Protoporphyrin IX Modes

$\nu_{46} : 373.48 \text{ cm}^{-1}$



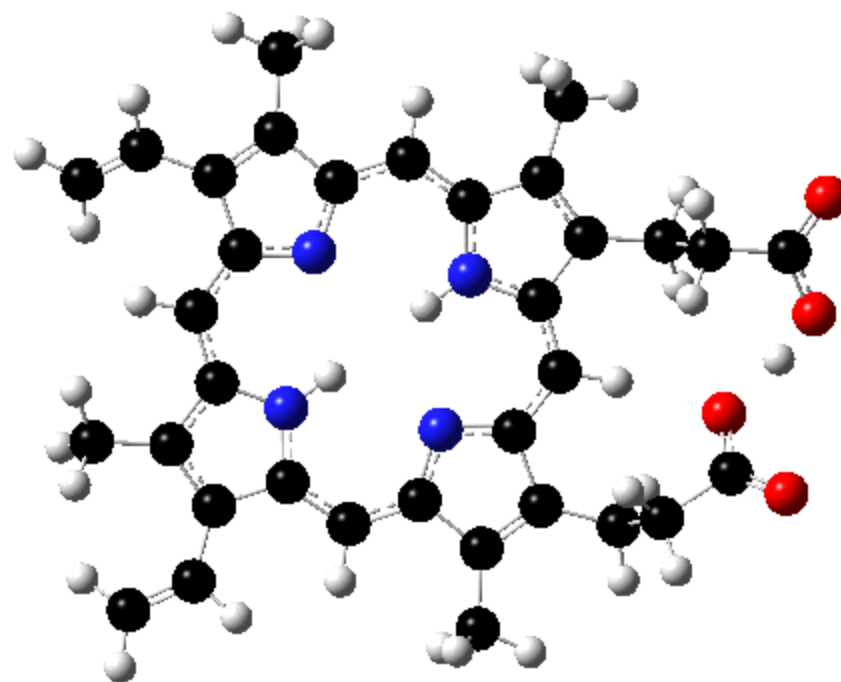
# Protoporphyrin IX Modes

$\nu_{67} : 679.86 \text{ cm}^{-1}$



# Protoporphyrin IX Modes

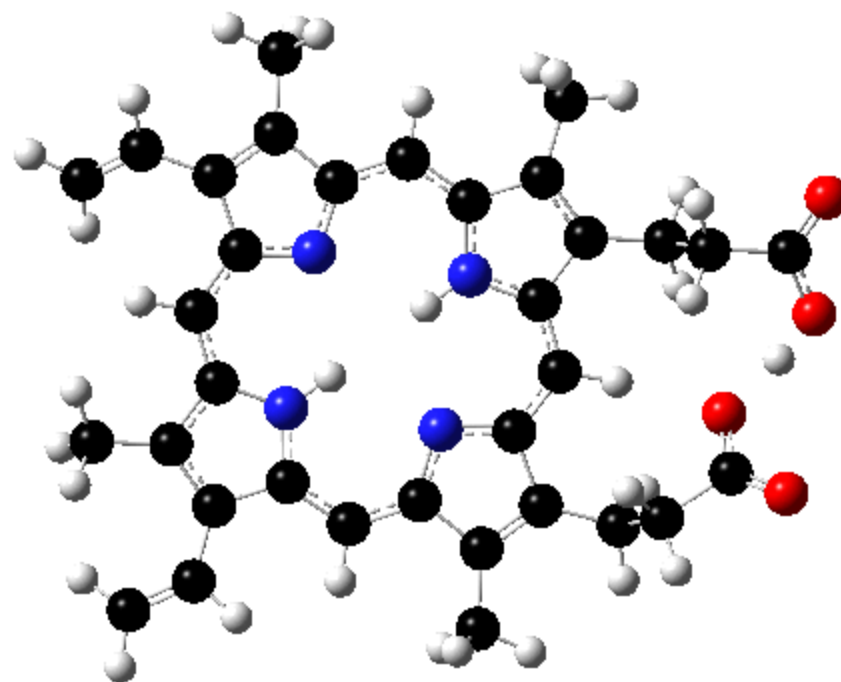
$\nu_{87} : 850.15 \text{ cm}^{-1}$





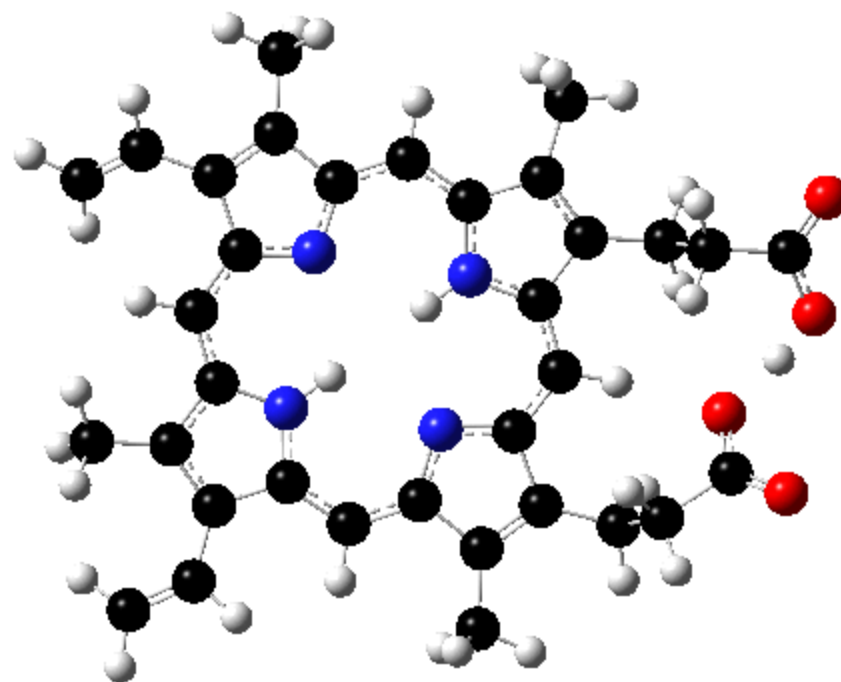
# Protoporphyrin IX Modes

$\nu_{101} : 1001.05 \text{ cm}^{-1}$



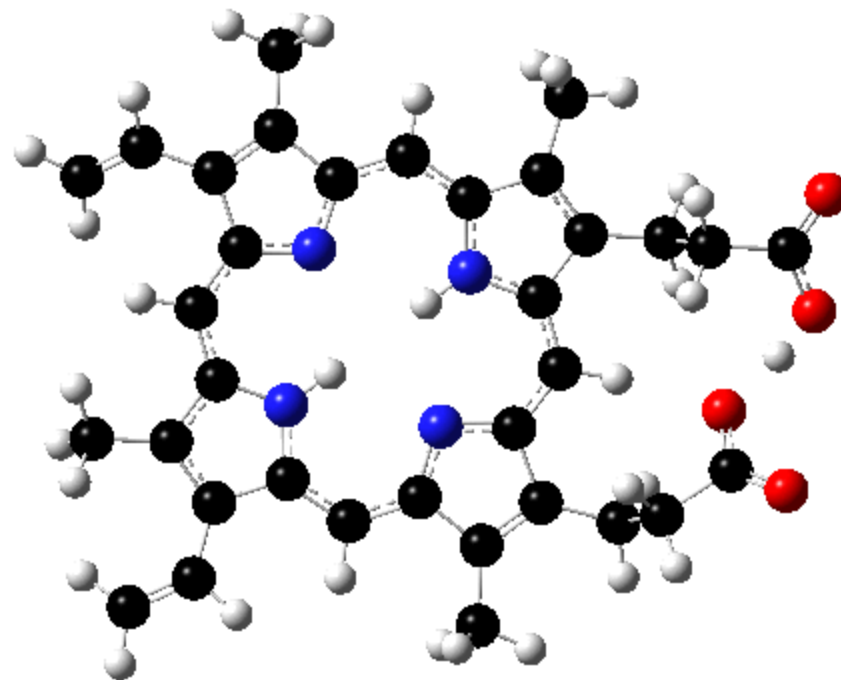
# Protoporphyrin IX Modes

$\nu_{103} : 1014.11 \text{ cm}^{-1}$



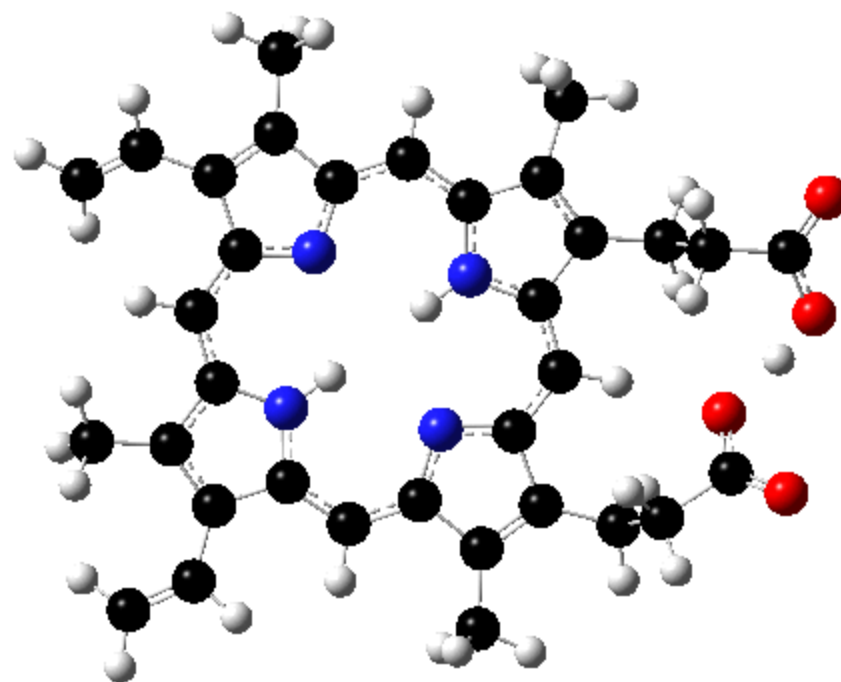
# Protoporphyrin IX Modes

$\nu_{122} : 1177.27 \text{ cm}^{-1}$



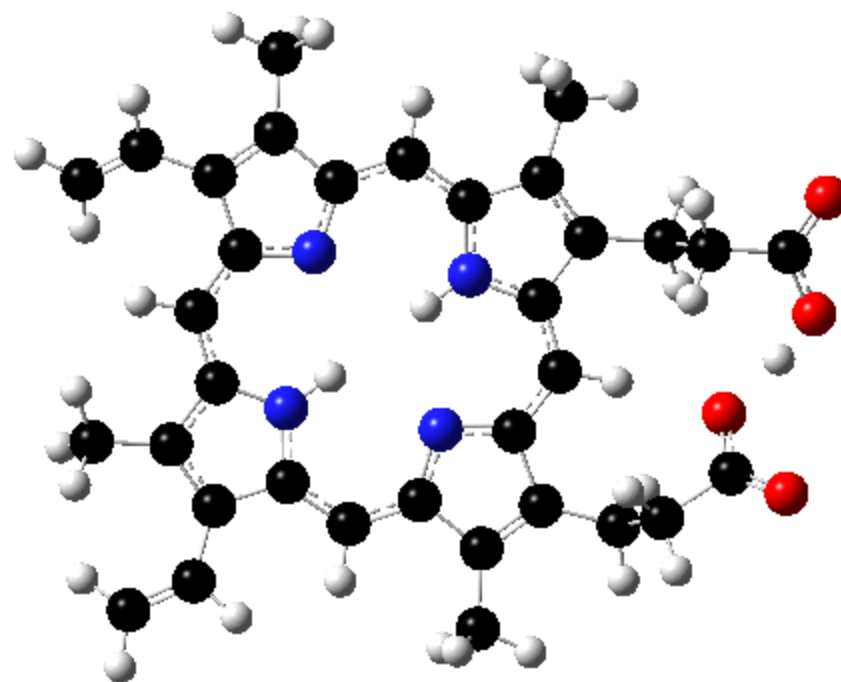
# Protoporphyrin IX Modes

$\nu_{131} : 1290.09 \text{ cm}^{-1}$



# Protoporphyrin IX Modes

$\nu_{146} : 1403.41 \text{ cm}^{-1}$



# Protoporphyrin IX Modes

$\nu_{183} : 1689.28 \text{ cm}^{-1}$

