Benzene 3D Representation in Blender

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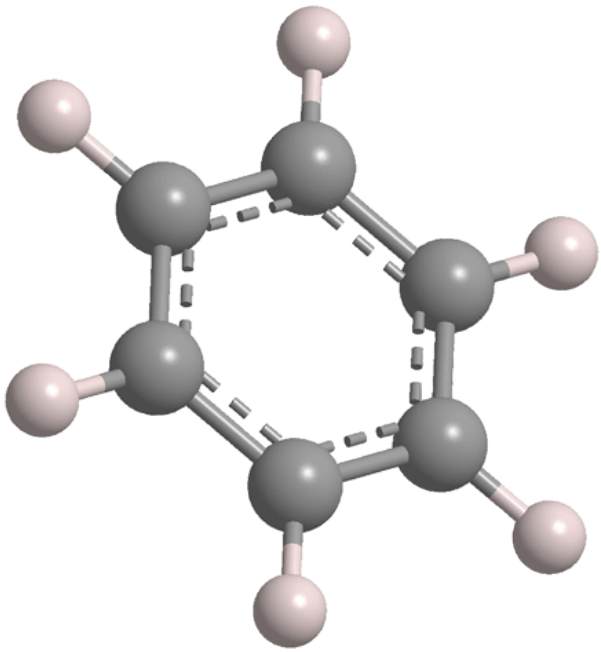

Figure 1: 3D rendering of benzene (C_6H_6) created in Blender

Project Overview

This project involved the creation of a 3D model of benzene (C6H6) using Blender, highlighting its hexagonal ring and delocalized -electron system. The model combines scientific accuracy with visual appeal for educational purposes.

Key Features

- **Accurate Molecular Geometry**: Perfect hexagonal arrangement of six carbon atoms with hydrogen atoms
- **Bond Representation**:
  - Single C-H bonds as cylindrical connections
  - Delocalized -system shown as alternating bonds or electron cloud
- **Visual Styling**:
  - Carbon atoms: Dark gray (metallic shading)
  - Hydrogen atoms: Light gray/white
  - Optional transparent electron cloud overlay

Technical Implementation

Modeling Process

- Hexagonal base mesh created with Blender's modeling tools
- Atoms represented as UV spheres with proportional scaling
- Bonds implemented as cylinders with correct bond angles (120°)

Materials and Rendering

- **Shader Setup**:
  - Principled BSDF shader for realistic atom materials
  - Subsurface scattering for organic appearance
- **Lighting**:
  - Three-point lighting setup
  - Optional emission shader for electron cloud

Applications

- Chemistry education visual aid
- Reference for molecular visualization projects
- Base model for more complex aromatic compounds

Future Enhancements

- Animation of electron delocalization
- Interactive WebGL export
- Molecular orbital visualization

Figure 2: Blender workspace showing the benzene model