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Organic Compounds Under High Pressure

有機物質を２種以上の分子から成る分子間化合物と１種の分子からできた単一有機分子化合物に分けた。ドナーとアクセプターの２種以上の分子からなる化合物の電気的性質は超伝導体と分子性導体に分けて文献を整理してみた。これらの研究に使われている高圧装置は銅ベリリウム製の容器で、クランプ型またはプレスと組み合わせた定加重式の装置である。高圧下の光学的研究にはダイヤモンドアンビル型の圧力発生装置が使用されている。圧力媒体にはフロリナートやメタノールーエタノール混合溶媒などの液体が用いられる。比較的静水圧性は良い物と思われる。低温、高圧下では超伝導や相転移が現れるなど多様な物性が見られているにもかかわらず、低温、高圧下の構造に関する研究はほとんど行われていない。今後は低温、高圧下のｘ線回折の研究が必要である。

単一有機分子はその電子構造が閉殻なので大気圧下ではほとんどが絶縁体である。有機半導体の研究がはなやかなころ高圧下の電気的性質がしらべられている。１９６０年代が最も多い。最近100 GPa（**１００万気圧**）**以上の圧力の発生が可能になり、酸素分子ですら超伝導になることが発見されている。ヨウ素や臭素も超伝導になる。ヨードアニルも約**50 GPa**で超伝導が見出されている。圧力の力を借りれば単一分子といえども劇的に性質を変えることがある。高い圧力が必要なためはダイヤモンドアンビル（単結晶ダイヤだけでなく焼結ダイヤも含む）を用いた高圧装置が中心的役割を果たすが、圧力媒体は固体又はサンプル自身で静水圧性は低い。ここでは電気的性質、光学的性質、構造の３つにわけた。高圧下のX線回折は高エネルギー研やSpring-8の軌道放射光を線源として用いている場合が多い。有機物質で高い圧力まで調べるには放射光は不可欠である。高圧下の単一有機分子のx線回折の研究は少し行われるようになってきたがまだ不十分である。特に単結晶の構造解析用の高圧技術の開発が重要である。**

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