A crown ether is an ether whose molecule features three or more ether groups in the same ring with any two adjacent ether groups always separated by two carbon atoms. The general structural formula of unsubstituted crown ethers is

\[(OCH_2CH_2)_n\]

with \(n \geq 3\).

The common name of an unsubstituted crown ether is 3n–crown–n. eg:

Crown ether molecules can trap metal ions by forming ion-dipole bonds with them, resulting in an entity known as host-guest complex, in which the crown ether molecule is the host and the metal ion is the guest.

eg:

Since the diameter of the cavity of a crown ether molecule is more or less a constant, the ability of a crown ether molecule to form a stable host-guest complex with a metal ion is highly selective.

eg:

- cavity diameter: 18–crown–6 > 15–crown–5
- ionic radius; K^+ > Na^+
18-crown-6 makes a stable host-guest complex with K\(^+\) (1), but not with Na\(^+\), whereas 15-crown-5 makes a stable host-guest complex with Na\(^+\) (2), but not with K\(^+\).