Avobenzone (also known as **Butyl Methoxydibenzoylmethane**) is an organic compound widely used as an active ingredient in sunscreen formulations. Its primary function is to absorb ultraviolet A (UV-A) radiation, which is crucial for protecting the skin from long-term damage such as premature aging and skin cancer.

Chemical Properties of Avobenzone:

1. **Chemical Structure**:
   - **IUPAC Name**: 1-(4-Methoxyphenyl)-3-(4-tert-butylphenyl)propane-1,3-dione
   - **Chemical Formula**: C20H22O3
   - **Molecular Weight**: 310.39 g/mol
   - **Structure**: Avobenzone is a dibenzoylmethane derivative with a methoxy group (-OCH3) and a tert-butyl group attached to aromatic rings. These groups are essential for its ability to absorb UV radiation.
2. **Physical Properties**:
   - **Appearance**: Avobenzone is a yellow crystalline powder.
   - **Solubility**: It is soluble in organic solvents such as ethanol and oils but is poorly soluble in water.
   - **Melting Point**: Approximately 81-86°C.
   - **Boiling Point**: Decomposes before boiling.
3. **UV Absorption**:
   - **Maximum Absorption Wavelength (λmax)**: Around 357 nm. Avobenzone is highly effective at absorbing UV-A rays, particularly in the 320-400 nm range, which are the longer wavelengths that penetrate deeper into the skin.
4. **Stability**:
   - **Photostability**: Avobenzone is known to degrade when exposed to sunlight, losing its effectiveness as a UV filter over time. This photodegradation can be mitigated by combining it with other stabilizing agents or photostable UV filters in sunscreen formulations.