

Crack CSIR-NET 2021 (Study Notes on DMSO)



Dimethyl sulfoxide (DMSO)

Introduction:

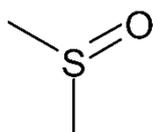
It is an organosulfur compound with formula $(\text{CH}_3)_2\text{SO}$. It is a colourless liquid, and it is a polar aprotic solvent which means it can dissolve both polar and nonpolar compounds. It is generally available as a prescription medicine. It can be applied to skin or can be taken by mouth and even can be injected into the veins. It comes from a substance which is found in wood. It is a by-product of paper making.

Production:

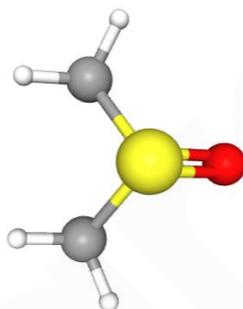
It is produced industrially by dimethyl sulphide which is a by-product of the Kraft process. Its production takes place in the atmosphere at the rate of 20-60 billion pounds per year. It is also present in soil and natural water. Its metabolism in soil (by microorganisms) helps in the formation of sulphur along with dimethyl sulphide.

Structure:

Its 2-D structure is:



Its 3-D structure is:

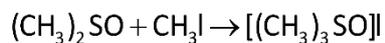


Properties:

Parameter	Value
Auto ignition temp, in air	300-302°C (572-575°F)
Boiling point (1 atmosphere)	189°C (372°F)
Critical molar volume	$2.38 \times 10^{-4} \text{ m}^3$
Critical Pressure	56.3 atm. abs.
Critical temperature	447°C (837°F)
Density, at 25°C	1.0955 g / cm ³
Molecular weight	78.13
pKa	35.1

Reactions of DMSO:

The sulphur centre present in DMSO acts as a nucleophile towards soft electrophiles and O acts as a nucleophile towards hard electrophiles. Its reaction with methyl iodide can be represented as:



It is also used in Swern oxidation in which oxidation of primary or secondary alcohol to aldehyde takes place in the presence of DMSO. It acts as a base during deprotonation of ketones, phosphonium salts and formamidinium salts.

Uses:

It is used to relieve the pain of osteoarthritis. It can also be used as an alternative in treatment of cancer. It is used to treat various conditions, and these are listed below:

Eye problems

Scars

Headache

Rheumatoid arthritis

Gradeup CSIR-NET Super Subscription

Features:

1. Memory Based Test Series of the actual exam paper.
2. All the CSIR NET Test Series based on the latest pattern and the trend that is followed.
3. Detailed performance analysis based on All India Rank after the completion of the test.
4. Mock Test are available in Hindi & English
5. Available on Mobile and Desktop

Gradeup Super Subscription, Enroll Now