# Chapter 15
# Chalcogenide-Based Nanocomposites for the Removal of Emerging Organic Micropollutants in Wastewater

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## ABSTRACT

*Nowadays, a fast growing in population creates organic and inorganic waste in the form of extensive effluence and which causes water pollution. Industries, agriculture, domestic processes, etc instigated a huge pollution to the water atmospheres everywhere in the world via various types of chemical elements and substances known as "emerging pollutants". Among them, an organic form is high attention as a result of their comparatively excessive intensities in water. The structural and behavioural diversity of these emerging organic pollutants creates their potential dangers to living organisms. This chapter deals about the chalcogenide-based nanocomposites are utilized like catalysts for removing environmental organic micropollutants in wastewater treatment. Owing to their low bandgaps, higher charge carrier movement with high visible-light absorbing properties, chalcogenide-based*

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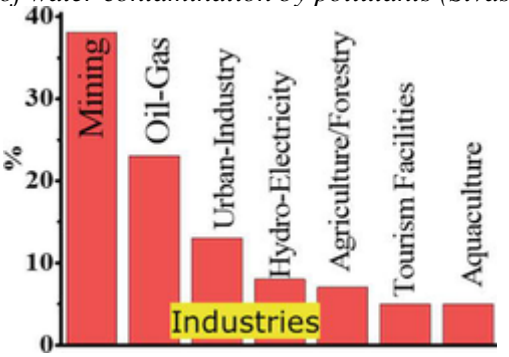
*nanocomposites are broadly used as photocatalysts. High efficacy, low-cost, precluding long-lasting pollutants, as well as direct utilization of solar energy are an advantage of the photocatalytic approach.*

## INTRODUCTION

The ever-increasing environmental troubles have been caused due to the human population and industrial development. To remove the emerging organic pollutants from wastewater, various analytical methods and removal techniques have been thoroughly analysed and developed over a period, (Wani et al, 2025). The industrial region liberated about 400 megatons of chemicals, with detrimental solvents as well as metal ions, entering the water, (Tari et al., 2024; Tari et al., 2021). In addition, industrial discarded, several human activities, such as using pesticides, fertilizers, and the discarding of home refuse, and several harmful organic substances like formaldehyde, azo dyes, dioxins, pesticides, as well as heavy metals contribute to the contamination of water bodies (Siddiqui et al. 2022; Tari & Patil, 2017a; Yalçın et al. 2022; Özşirvan et al. 2024; Tari & Patil, 2017b). Every year, about 15% of indestructible textile dyes are released into waterways. The World Bank estimated that the textile business activities caused water pollution of about 17–20% (Holkar, 2016). The majority of organic dyes have carcinogenic effects, which creates substantial health hazards to humans and aquatic life. These toxins may prompt several health problems, for example, cancer, neurological weakening, cardiovascular syndromes, and digestive disorders, also existing in slight amounts, (Tari et al. 2025; Al-Tohamy, 2022, Tari et al. 2022). The water contamination by various sources is shown in Figure 1.

*Figure 1. Resource of water contamination by pollutants (Sivasamy et al., 2024)*



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