

<<天然有机质及其在环境中的作用>>

图书基本信息

书名：<<天然有机质及其在环境中的作用>>

13位ISBN编号：9787030238740

10位ISBN编号：7030238745

出版时间：2009-1

出版时间：科学出版社

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页数：325

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内容概要

本文主要以陆地地表淡水湖泊与河流水环境为例，对天然有机质的来源、化学结构、循环特征，与养分循环的耦合关系，对有毒金属元素和有机污染物迁移转化和毒性影响机理等几个方面的研究进展进行了简要的总结；针对我国水体富营养化和环境污染等重要环境问题，阐述当前应该采取的研究思路和存在的主要科学内容，并对现代有机环境与生物地球化学学科的研究趋势进行了展望。

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章节摘录

1.2 Origin and Specification of Autochthonous DOM in the Aquatic Environment Autochthonous DOM can practically define as any new organic substance usually originated in the aquatic media by any natural processes. A rough estimation showed that an increase in autochthonous DOC contents is 0-88% in lakes, and 0-194% in oceans (Table 1.2). This estimation of autochthonous input of DOM was very rough, as photodegradation effects as well as microbial consumption on mineralization of DOM at epilimnion were not taken into consideration here. However, microbial consumption was supposed to be very little effective as it might simultaneously occur in both epilimnion and hypolimnion. The DOC concentrations started to increase in the early summer season and continued to increase until the winter prior when vertical mixing occurred in lake waters. For example, in Lake Biwa during winter-spring seasons (January-April), DOC was uniformly distributed throughout the entire water column due to vertical mixing, an increase in DOC concentrations started on May and reached a maximum in the summer season (July-September) when water temperature was highest (26.5-28.4~C) during the period of 1999-2001 (Mostofa et al. , 2005b and unpublished data). Therefore, high autochthonous production might be a vital observable factor which may control the dynamics and cycling of DOM in natural lake and oceanic environment.

1.2.1 Mechanism of autochthonous input of DOM in the aquatic environment It is a fundamental question about the mechanism of autochthonous DOM in the aquatic environments as confusion is frequently revealed, arguing DOM is produced either by photosynthesis during summer season (Takahashi et al. , 1995; Anderson and Williams , 1998; Marafibn et al. , 2004) or by direct release from Chlorophyll phytoplankton (Kirchman et al. , 1995; Carrillo et al. , 2002; Rochelle-Newall and Fisher , 2002; Nieto-Cid et al. , 2006) or bacterial metabolism of plankton biomass (Hart et al. , 2000; Nelson et al. , 2004; Medina-Sanchez et al. , 2006). Therefore, the major processes associated with the origin of autochthonous input of DOM in natural waters can be discriminated as : photosynthesis, biological activities, and photo-induced generation of DOM from particulate organic matter.

1.2.1.1 Photosynthesis The most important source of autochthonous DOM is the photosynthesis process where carbohydrates are formed by the reaction of CO₂ and H₂O in the aquatic environments. Both CO₂ and H₂O are simultaneously produced by the photodegradation of DOM in waters (Eq. 1; Moran and Zepp , 1997; Gao and Zepp , 1998; OSullivan et al. , 2005; Mostofa et al. , 2008). Besides those, dissolved inorganic carbon (DIC), low molecular-weight (LMW) DOM, and thermal energy, E (_+), are sequentially formed at the same time during photodegradation (Mopper et al. , 1991; Amon and Benner , 1994; Moran and Zepp , 1997; Gao and Zepp , 1998).

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《天然有机质及其在环境中的作用（英文版）》针对我国水体富营养化和环境污染等重要环境问题，阐述当前应该采取的研究思路和存在的主要科学内容，并对现代有机环境与生物地球化学学科的研究趋势进行了展望。

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