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Outlook on optical identification of micro- and nanoplastics in aquatic environments

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# 1 Outlook on optical identification of micro- and nanoplastics in aquatic 2 environments

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## 8 Abstract

9 Plastic pollution in natural water bodies is an emerging problem that requires quick actions.  
10 Recently, the role of micro- and nanoplastics in pollution and health issues has been realized  
11 and taken seriously. In this paper, we have studied optical properties, such as NIR spectra and  
12 refractive index, of some common plastic materials and present a method and data to screen  
13 especially problematic transparent plastics with rough surface in aquatic environments. We  
14 also give an outlook of possible optical measurement methods that could be used for detection  
15 of micro- and nanoplastics.

16 Keywords: Microplastics; Nanoplastics; NIR spectroscopy; Ellipsometry

## 17 1 Introduction

18 Plastic pollution of oceans (Eriksen, et al., 2014; Jambeck, et al., 2015), lakes and rivers  
19 (Yokota, et al., 2017) is a global problem. About 280 million tons of plastics is produced in  
20 every year and, unfortunately, part of this material enters water systems. Recently, reasonable  
21 and alarming concerns have been expressed that especially tiny plastic particles are harmful to  
22 water organism, fishes and other living beings in seas. Plastics, in general, can be considered  
23 as un-decomposable material, however over the time, plastic falls to smaller and smaller pieces  
24 due the mechanical and chemical processes. The floating plastic debris is subject to UV

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