### Accepted Manuscript

Research paper

Influence of dopants on supercontinuum generation during the femtosecond laser filamentation in water

He Li, Zhe Shi, Xiaowei Wang, Laizhi Sui, Suyu Li, Mingxing Jin

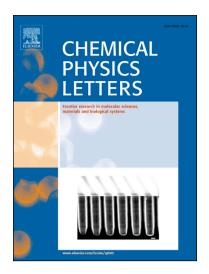
PII: S0009-2614(17)30467-0

DOI: http://dx.doi.org/10.1016/j.cplett.2017.05.029

Reference: CPLETT 34818

To appear in: Chemical Physics Letters

Received Date: 14 April 2017 Accepted Date: 10 May 2017



Please cite this article as: H. Li, Z. Shi, X. Wang, L. Sui, S. Li, M. Jin, Influence of dopants on supercontinuum generation during the femtosecond laser filamentation in water, *Chemical Physics Letters* (2017), doi: http://dx.doi.org/10.1016/j.cplett.2017.05.029

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## **ACCEPTED MANUSCRIPT**

# Influence of dopants on supercontinuum generation during the femtosecond laser filamentation in water

He Li<sup>a,b</sup>, Zhe Shi<sup>a,b</sup>, Xiaowei Wang<sup>a,b</sup>, Laizhi Sui<sup>a,b</sup>, Suyu Li<sup>a,b,\*</sup> Mingxing Jin<sup>a,b\*</sup>

Our experiments show that lactose as one of organic substance and nitric acid as one of inorganic substance added into distilled water can influence the supercontinuum generation in aqueous solution irradiated by the ultrashort femtosecond laser pulses. It is found that once the dopants are added into the water, the supercontinuum generation is suppressed to different extent, and the supercontinuum suppression is enhanced by increasing the concentrations of lactose solution and nitric acid solution. Through the analysis, we find that the capture of electrons by the solvent, and spectral absorption or scattering by the solution may also result in the supercontinuum suppression. These studies will be helpful to understanding of the supercontinuum generation during femtosecond filamentation in liquid samples.

Keywords: asymmetric broadening, supercontinuum suppression, absorption spectra

#### 1. Introduction

Laser filamentation is well known to be a dynamically balanced process between the self-focusing resulted from Kerr effect and plasma defocusing resulted from the multiphoton/tunning ionization [1,2]. Many nonlinear effects, such as fluorescence emission [3,4], terahertz radiation [5,6] and supercontinuum generation [7,8] *etc.* are involved in the process of filamentation. Among these nonlinear effects, the supercontinuum generation attracts a great deal of interest due to its potential and

E-mail addresses: sylee@ jlu.edu.cn (S. Li), mxjin@jlu.edu.ch (M. Jin).

\_

<sup>&</sup>lt;sup>a</sup> Institute of Atomic and Molecular Physics, Jilin University, Changchun 130012, China

<sup>&</sup>lt;sup>b</sup> Jilin Provincial Key Laboratory of Applied Atomic and Molecular Spectroscopy (Jilin University), Changchun 130012, China

<sup>&</sup>lt;sup>c</sup> State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering, Jilin University, Changchun 130012, China

<sup>\*</sup> Corresponding authors at: Institute of Atomic and Molecular Physics, Jilin University, Changchun 130012, China.

### Download English Version:

## https://daneshyari.com/en/article/5377859

Download Persian Version:

https://daneshyari.com/article/5377859

<u>Daneshyari.com</u>