Development of Measurement Methods for Hydrogen Oxidation in Andosol

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Abstract

The biological hazard of atmospheric HT is not significant compared to HTO because of its low transfer rate to life forms. However, soil microbes oxidize HT into HTO. Therefore, in order to assess the realistic impact of atmospheric HT to dose estimation, investigation of HT oxidation in soil is necessary. In this study, we configured and implemented a measurement system for oxidation of hydrogen in soil using deuterium (D_2) as a tracer.

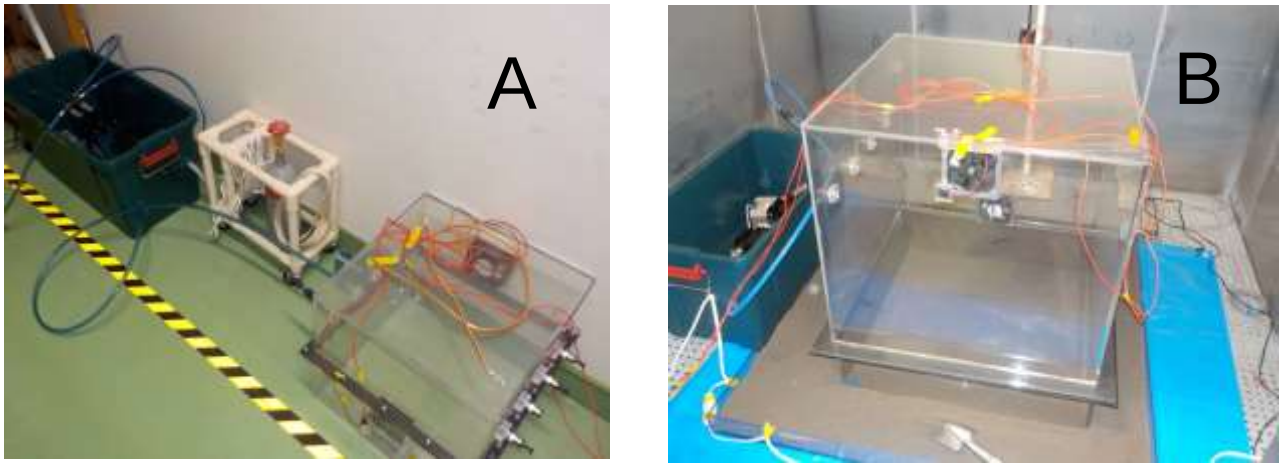

Fig.1 Photos of the developed system to measure oxidation of H_2 in soil.
A Mixing chamber connected to air pump and D_2 tank. B Reaction chamber set over a layer of andosol and connected to an air pump.

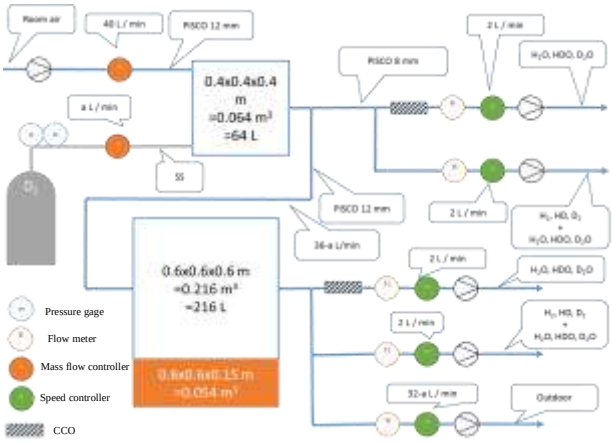

Fig.2 Drawing of the piping arrangement of the developed system

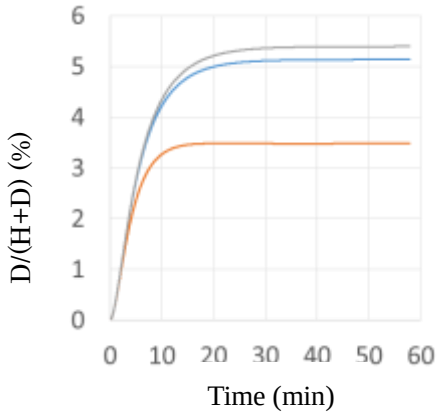

Fig.3 Estimation of D/(H+D) ratio

Red, blue, and gray line show the estimation of D/(H+D) ratio corresponding to the oxidation rate constants of 0.001, 0.0001, and 0.00001, respectively.