

ARTICLE

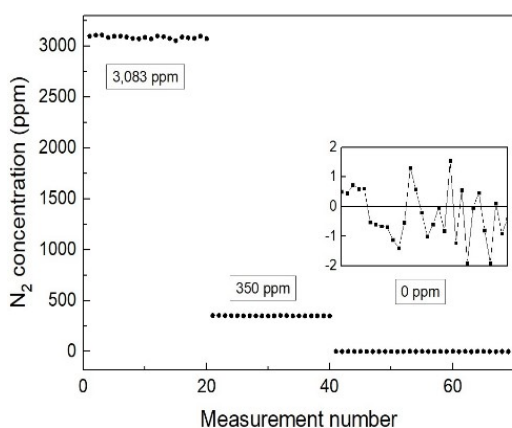
Compact AC-glow discharge-optical emission spectrometer for real-time detection of N₂, Ar in O₂ by sub-ppm-level sensitivity

Received 00th January 20xx,
Accepted 00th January 20xx

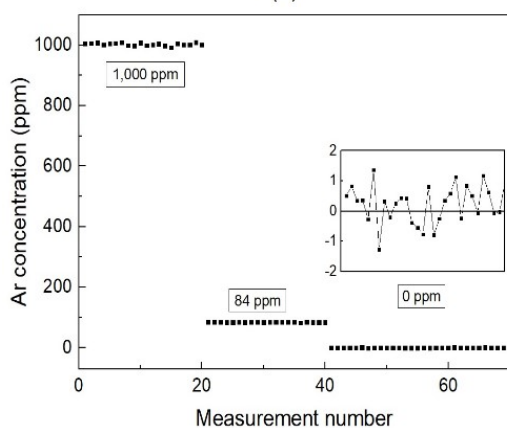
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DOI: 10.1039/x0xx00000x

Supplementary materials



(a)



(b)

Figure S1. (a) Repeated measurement results of N₂ for 3 different concentrations in O₂ ambient. Acquisition time for each datum is 1 s. (b) Repeated measurement results of Ar for 3 different concentrations. Acquisition time for each datum is 0.1 s.

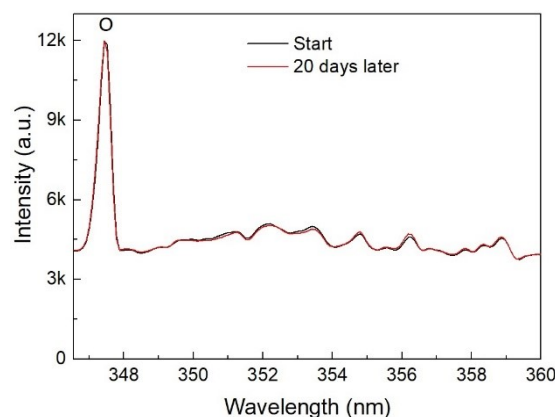


Figure S2. Long term (20 days) observation result on emission signal intensity from O₂ plasma in the uv region. The concentration of N₂ was sustained below 1 ppm under O₂ ambient. The duration time and interval of plasma generation were 2 and 60 s, respectively.

Changing the mixing ratio of the sample gases with the high-purity O₂ gas, the emission signals were measured repeatedly with given acquisition times, such as 1 s for N₂ and 0.1 s for Ar. The flow rate of the mixed sample gases was maintained as ~ 50 sccm (standard cubic centimeter per minute). Fig. S1 shows the repeated measurement results on the 3 different concentrations of N₂ (3,083, 350, 0 ppm) and those of Ar (1,000, 84, 0 ppm) in O₂.

To check the life span of the electrodes, the emission spectrum was measured turning on and off the plasma repeatedly in O₂ ambient for a long time. With duration time of 2 s and interval of 60 s for plasma generations, the emission spectrum was continuously monitored for 20 days. Fig. S2 shows the initial and the last spectra within the period. The sample gas is from another company. According to the reference data by gas chromatography, the concentration of N₂ was maintained below 1 ppm all the time. But, the concentrations of the other gas species are not guaranteed.

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Electronic Supplementary Information (ESI) available: [details of any supplementary information available should be included here]. See DOI: 10.1039/x0xx00000x