Supporting Materials

The study interpreted the *m/z* 36 as $[H_2O\text{-}H\text{-}OH]^+$, and the literatures had been reported that microwave plasma torch (MPT) sources produced little or no ammonium ions. Some literatures proved $[H_2O\text{-}H\text{-}OH]^+$, such as [34]-[37] in main text. Moreover, we employed an auxiliary experiment, with experimental conditions keeping almost the same as the original experiment, including microwave power being 150W and discharge gas flow rate such as support gas being 600 mL/min and carrier gas being 900 mL/min. In this auxiliary experiment, an aerosol produced by lead standard solution ($10\mu g \cdot L^{-1}$) flowed across the plasma flame through the central cube of the MPT ion source, and were analyzed by a Time-of-Flight mass spectrometer（API-TOF MS 5000; Guangzhou Hexin Co., Ltd.）under positive ion detection mode. The generated adduct ions of lead were detected and identified，and the software of Molecular Weight Calculator was employed to analyze the exact molecular formulas.

The simulation result by the software of Molecular Weight Calculator showed that the ionic formula of *m/z* 242.8692 should be $[^{208}Pb(OH)H_2O]^+$ but not $[^{208}Pb(OH)NH_4]^+$ based on the natural isotope distribution of these elements, illustrating in Figure S1. The auxiliary result certified indirectly that was the hydrated ion, but not NH_4^+, which was dominant in the air-opened Ar-MPT plasma. Based on this result, we deduced the ions of *m/z* 36 should be $[H_2O\text{-}H\text{-}OH]^+$ but not any else.

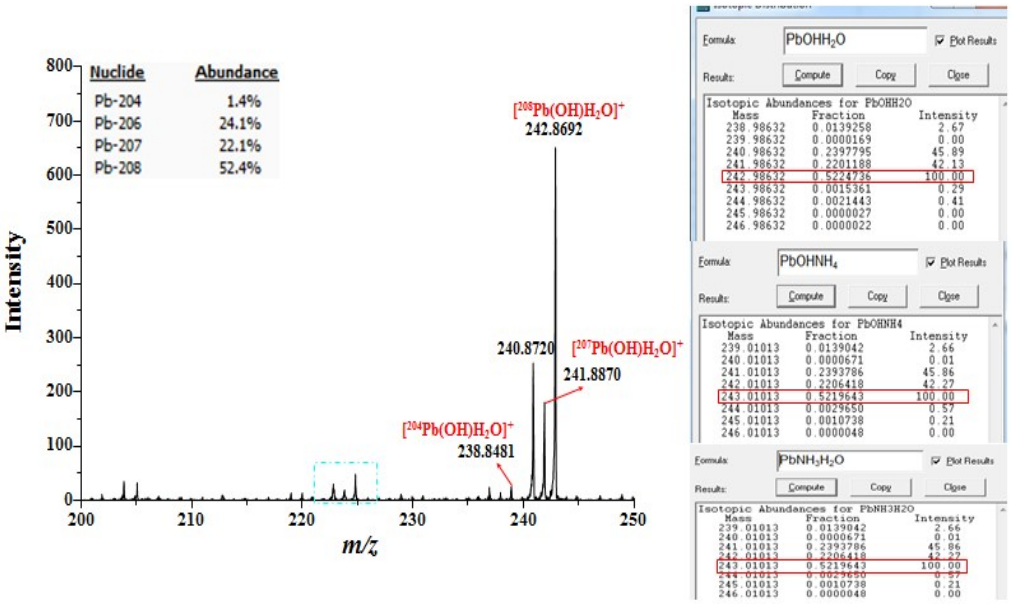

Figure S1. Detection of the lead ions in aqueous by MPT-MS.