

Elimination of dimethyl methylphosphonate by plasma flame made of microwave plasma and burning hydrocarbon fuel

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Elimination of dimethyl methylphosphonate (DMMP) in liquid-phase was studied by making use of a microwave plasma burner, exhibiting a safe removal capability of stockpiled chemical weapons. The microwave plasma burner consisted of a fuel injector and a plasma flame exit connected in series to a microwave plasma torch. The burner flames were sustained by injecting hydrocarbon-fuels into the microwave plasma torch in air discharge. The Fourier transform infrared (FTIR) spectra indicated near perfect elimination of DMMP in the microwave plasma burner. This was confirmed by gas chromatography (GC) spectra as supporting data, revealing the disappearance of even intermediary compounds in the process of DMMP destruction. The experimental results and the physical configuration of the microwave plasma burner may provide an effective means of on-site removal of the chemical warfare agents found on a battlefield.