APPARATUS AND METHOD FOR CONTROLLED COMBUSTION OF GASEOUS POLLUTANTS

ABSTRACT

The present invention relates to systems and methods for controlled combustion of gaseous pollutants while reducing and removing deposition of unwanted reaction products from within the treatment systems. The systems employ a two-stage thermal reactor having an upper thermal reactor including at least one inlet for mixing a gaseous waste stream with oxidants and combustible fuels for thermal combustion within the upper thermal reactor. The upper thermal reactor further includes a double wall structure having an outer exterior wall and an interior porous wall that defines an interior space for holding a fluid and ejecting same, in a pulsating mode, through the interior porous wall into the upper thermal reactor to reduce deposition of the reaction products on the interior of the upper reactor chamber. The two-stage thermal reactor further includes a lower reactor chamber for flowing reaction products formed in the upper thermal reactor through a water vortex that provides a water overflow along the interior of the lower reactor chamber thereby reducing deposition of unwanted products on the interior surface of the lower reactor.

FIGURE 1