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(54) Title: SORBENT POLYMER COMPOSITES INCLUDING PHOPHONIUM HALIDES, FLUE GAS TREATMENT DEVICES AND FLUE GAS TREATMENT METHODS UTILIZING THE SAME

(57) Abstract: Some embodiments of the present disclosure relate to a device comprising a sorbent polymer composite and at least one phosphonium halide. In some embodiments, the device is configured to treat a flue gas stream. In some embodiments, the flue gas stream comprises oxygen, water vapor, at least one SO_x compound, and mercury vapor. Some embodiments of the present disclosure relate to a method comprising treating the flue gas stream by: passing the flue gas stream over the device, reacting the oxygen and water vapor of the flue gas stream with the at least one SO_x compound on the sorbent polymer composite, so as to form sulfuric acid, and reacting the mercury vapor with the at least one phosphonium halide, so as to fix molecules of the mercury vapor to the sorbent polymer composite.