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(54) **Title:** CARBON-BASED NANOMATERIAL COMPOSITION AND METHODS OF FORMING THE SAME FROM A GAS MIXTURE THAT INCLUDES ACETYLENE AND METHANE GAS

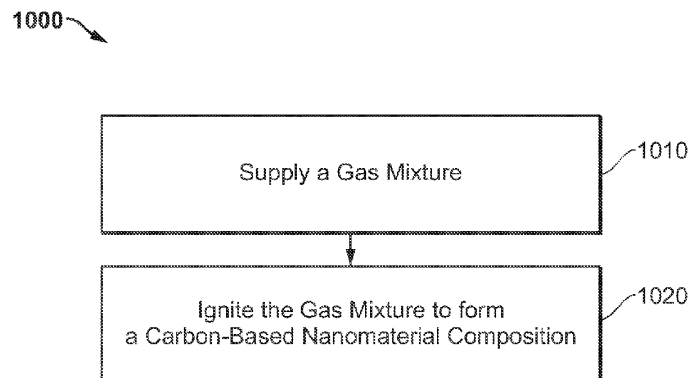


FIG. 1

(57) **Abstract:** The present disclosure relates to a carbon-based nanomaterial composition that may be formed from a gas mixture. The gas mixture may include acetylene gas at a molar ratio AG_{mol}/GM_{mol} of at least about 0.25 and not greater than about 0.99, oxygen gas at a molar ratio OG_{mol}/GM_{mol} of at least about 0.01 and not greater than about 0.55, hydrogen gas at a molar ratio HG_{mol}/GM_{mol} of at least about 0.05 and not greater than about 0.75, and methane gas at a molar ratio MG_{mol}/GM_{mol} of at least about 0.25 and not greater than about 0.99. The carbon-based nanomaterial composition may have a carbon hybridization ratio P_{sp3}/P_{sp2} of at least about 0.0 and not greater than about 5.0, where P_{sp3} is the percent of carbon within the carbon-based nanomaterial composition having a sp^3 hybridization and P_{sp2} is the percent of carbon within the carbon-based nanomaterial composition having a sp^2 hybridization.

[Continued on next page]

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- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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