



(51) International Patent Classification:

C07B 41/00 (2006.01) **C07C 51/093** (2006.01)
B01J 21/18 (2006.01) **C07C 29/09** (2006.01)
C07C 45/42 (2006.01)

(21) International Application Number:

PCT/US2011/038334

(22) International Filing Date:

27 May 2011 (27.05.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/349,378 28 May 2010 (28.05.2010) US
 61/440,574 8 February 2011 (08.02.2011) US

(71) **Applicant** (for all designated States except US): **BOARD OF REGENTS, THE UNIVERSITY OF TEXAS SYSTEM** [US/US]; 201 West 7th Street, Austin, Texas 78701 (US).

(72) Inventors; and

(75) **Inventors/Applicants** (for US only): **BIELAWSKI, Christopher W.** [US/US]; 3105 S. I-35 #2070, Austin, Texas 78741 (US). **DREYER, Daniel R.** [US/US]; 7121 Hart Lane, Apt. 1097, Austin, Texas 78731 (US). **JIA, Hong-Peng** [CN/CN]; JIA, Hongpeng, Hongwen Road, Yard 43, Building 45, APT-21, Jintai District, Baoji, Shaanxi 721004 (CN).

(74) **Agent**: **LECOINTE, Michelle M.**; Baker Botts L.L.P., 98 San Jacinto Blvd., Suite 1500, Austin, Texas 78701 (US).

(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) **Title**: CARBOCATALYSTS FOR CHEMICAL TRANSFORMATIONS

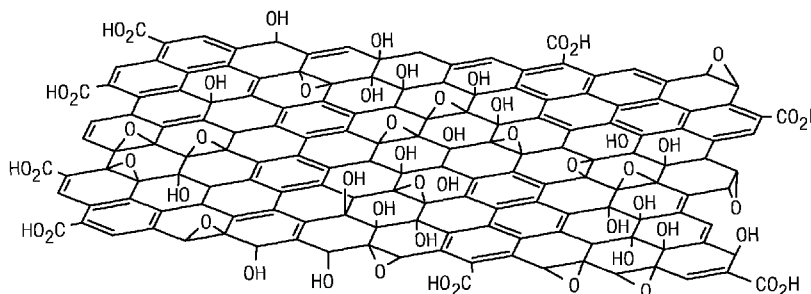


FIG. 1

(57) **Abstract**: The disclosure relates to catalytically active carbocatalysts, e.g., a graphene oxide or graphite oxide catalyst suitable for use in a variety of chemical transformations. In one embodiment, it relates to a method of catalyzing a chemical reaction of an organic molecule by reacting the organic molecule in the presence of a sufficient amount of graphene oxide or graphite oxide for a time and at a temperature sufficient to allow catalysis of a chemical reaction. According to other embodiments, the reaction may be an oxidation reaction, a hydration reaction, a dehydrogenation reaction, a condensation reaction, or a polymerization reaction. Some reactions may include auto-tandem reactions. The disclosure further provides reaction mixtures containing an organic molecule and graphene oxide or graphite oxide in an amount sufficient to catalyze a reaction of the organic molecule.