



(51) International Patent Classification:

C08F 22/14 (2006.01) C02F 1/44 (2006.01)
 B01D 61/00 (2006.01) C02F 1/52 (2006.01)
 B01D 63/00 (2006.01) C02F 1/68 (2006.01)
 C02F 1/00 (2006.01) C08F 212/08 (2006.01)
 C02F 1/26 (2006.01) C08F 8/32 (2006.01)

(21) International Application Number:

PCT/CA2011/050777

(22) International Filing Date:

15 December 2011 (15.12.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/423,458 15 December 2010 (15.12.2010) US
 PCT/CA2011/050075
 10 February 2011 (10.02.2011) CA
 61/522,424 11 August 2011 (11.08.2011) US

(71) Applicants (for all designated States except US):

QUEEN'S UNIVERSITY AT KINGSTON [CA/CA];
 Queen's University, Kingston, Ontario K7L 3N6 (CA).
 GREENCENTRE CANADA [CA/CA]; 945 Princess
 Street, Kingston, Ontario K7L 3N6 (CA).

(72) Inventors; and

(75) Inventors/Applicants (for US only): JESSOP, Philip G.
 [CA/CA]; 71 Kenwoods Circle, Kingston, Ontario K7K
 6Y1 (CA). MERCER, Sean M. [CA/CA]; 74 Forestside
 Crescent, Halifax, Nova Scotia B3M 1M4 (CA).
 ROBERT, Tobias [DE/CA]; 444 Montreal Street, Apt. 2,
 Kingston, Ontario K7K 3H7 (CA). BROWN, R. Stephen
 [CA/CA]; 136 Beverley Street, Kingston, Ontario K1R
 7Y6 (CA). CLARK, Timothy James [CA/CA]; 40 Strath-

cona Crescent, Kingston, Ontario K7M 1N8 (CA). MARI-
 AMPILLAI, Brian, Ernest [CA/CA]; 545 Albert Street,
 Unit #1, Kingston, Ontario K7K 4M5 (CA). RESENDES,
 Rui [CA/CA]; 1456 Hanover Drive, Kingston, Ontario
 K7P 0B5 (CA). WECHSLER, Dominik [DE/CA]; 957
 Ambleside Crescent, Kingston, Ontario K7P 2B6 (CA).

(74) Agents: OSLER, HOSKIN & HARCOURT LLP et al.;
 Suite 1900, 340 Albert Street, Ottawa, Ontario K1R 7Y6
 (CA).

(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, QA, RO, RS, RU, RW, 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, RW, 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).

Published:

— with international search report (Art. 21(3))

(54) Title: SYSTEMS AND METHODS FOR USE OF WATER WITH SWITCHABLE IONIC STRENGTH

(57) Abstract: Methods and systems for use of switchable water, which is capable of reversibly switching between an initial ionic strength and an increased ionic strength, is described. The disclosed methods and systems can be used, for example, in distillation-free removal of water from solvents, solutes, or solutions, desalination, clay settling, viscosity switching, etc. Switching from lower to higher ionic strength is readily achieved using low energy methods such as bubbling with CO₂, CS₂ or COS or treatment with Bronsted acids. Switching from higher to lower ionic strength is readily achieved using low energy methods such as bubbling with air, inert gas, heating, agitating, introducing a vacuum or partial vacuum, or any combination or thereof.

