



- (51) **International Patent Classification:**
C12Q 1/68 (2006.01) *C07D 239/54* (2006.01)
- (21) **International Application Number:**
PCT/US2015/014844
- (22) **International Filing Date:**
6 February 2015 (06.02.2015)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/936,628 6 February 2014 (06.02.2014) US
- (71) **Applicant:** THE REGENTS OF THE UNIVERSITY OF COLORADO, A BODY CORPORATE [US/US]; 1800 Grant Stree, 8th Floor, Denver, CO 80203 (US).
- (72) **Inventors:** BOWMAN, Christopher, N.; 5205 Waterstone Drive, Boulder, CO 80301 (US). KLOXIN, Christopher, J.; 337 South College Avenue, Newark, DE 19711 (US). XI, Weixian; 2985 E. Aurora Avenue, Apt. 430, Boulder, CO 80303 (US). GONG, Tao; 1800 Grant Street, 8th Floor, Denver, CO 80203 (US). PATTANAYAK, Sankha; 1800 Grant Street, 8th Floor, Denver, CO 80203 (US).
- (74) **Agent:** GRISWOLD, Ian, J.; Johnson, Marcou & Isaacs, LLC, 317a East Liberty St., Savannah, GA 31401 (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, BN, 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, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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.

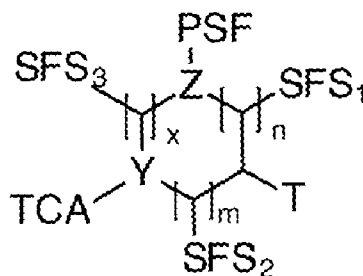
(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, 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, KM, ML, MR, NE, SN, TD, TG).

Published:

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

(88) **Date of publication of the international search report:**
19 November 2015

(54) **Title:** THIOL-X CLICK FOLDAMERS FOR POLYMER AFFINITY AND CATALYSIS LIBRARIES



(57) **Abstract:** Click thiol-X monomers and polymers containing such monomers are disclosed. The clickable sequence controllable monomers include an optionally protected thiol moiety; an optionally protected Michael acceptor moiety; a primary functional side chain and one or more secondary functional side chains. A clickable sequence controllable monomer, can have the structure: (formula), wherein independently Y and Z are atoms having a valence electrons of 3 or more; n is a integer from 0-10; m is a integer from 0-10; x is a integer from 0-10; PFS is a functional group SFSi; SFS2; and SFS3 are independently a combination of hydrogen, hydroxyl, aromatic, amine, carboxyl, and carbonyls, optionally substituted to form hydrophilic, hydrophobic, amphiphilic, or charged (positive or negative or both) side chains; T is an optionally protected thiol; and TCA is an optionally protected thiol-click acceptor. Methods of using such polymers are also disclosed.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US15/14844

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - C12Q 1/68; C07D 239/54 (2015.01)

CPC - C12Q 1/6876; C07D 239/54

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8): C12Q 1/68; C07D 239/54 (2015.01)

CPC: C12Q 1/6876; C07D 239/54

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data); ProQuest; Scifinder; Google/Google Scholar;

KEYWORDS: clickable, monomer, thiol, Michael type, controllable, acceptor, functional, side, chain, repeat, unit

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2013/148165 A1 (THE REGENTS OF THE UNIVERSITY OF COLORADO, A BODY CORPORATE) 03 October 2013; page 29, lines 11-17; claims 7-10	1-3, 4/1-3
A	US 2011/0171448 A1 (TANG, B et al.) 14 July 2011; entire document	1-3, 4/1-3
A	US 2009/0124534 A1 (REINEKE, TM) 14 May 2009; entire document	1-3, 4/1-3
A	US 2011/0129921 A1 (JOHNSON, PH et al.) 02 June 2011; entire document	1-3, 4/1-3

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

03 May 2015 (03.05.2015)

Date of mailing of the international search report

04 JUN 2015

Name and mailing address of the ISA/

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Shane Thomas

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US15/14844

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 5-39
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.