James Fraser STODDART

List of Publications and Patents

Evanston IL

October 2020


34. Conformational studies on oxa, thia, and aza derivatives of 7,8,13,14-tetrahydro-benz[1,2]\textit{c}cyclononona[5,6,7\textit{de}]-naphthalene and \textit{8H,15H}-7,16-dioxacyclodeca[1,2,3-de,6,7,8-d\textit{e}]-naphthalene (D.J. Brickwood, W.D. Ollis, J.F. Stoddart), \textit{Angew. Chem., Int. Ed. Engl.} \textbf{1974}, 13, 731–732. [2]


73. From carbohydrates to enzyme analogues (Tate and Lyle Lecture) (J.F. Stoddart), *Chem. Soc. Rev.* **1979**, 8, 85–142. [211]


77. Holes, handedness, handles, and hopes - meeting the requirements of primary binding, chirality, secondary binding, and functionality in enzyme analogues (J.F. Stoddart) in Proceedings of the Summer School on Bioenergetics and Thermodynamics: Model systems, 21 May-1 June 1979, Tabiano, Italy (ed. A. Braibanti), Reidel, Dordecrupt, Holland, 1980, pp. 43–62.


130. Second sphere coordination of \([\text{Pt(bipy)(NH₃)}₂]^{2+}\) by dibenzo-crown ethers. Solution spectroscopic studies of the crystal and molecular structures of \([\text{Pt(bipy)(NH₃)}₂·\text{dibenzo-36-crown}-12][\text{PF₆}]₂·0.6\text{H₂O}\) and \([\text{Pt(bipy)(NH₃)}₂·\text{dibenzo-24-crown}-8][\text{PF₆}]₂\) (H.M. Colquhoun, S.M. Doughty, J.M. Maud, J.F. Stoddart, D.J. Williams, J.B. Wolstenholme), Israel J. Chem. 1985, 25, 15–26. [31]  


152. Second-sphere coordination of cationic rhodium complexes [Rh(L)(NH$_3$)$_2$]$^+$ by dibenzo-3n-crown-n ethers [n = 6–12; L = 1,5-cyclooctadiene (cod) or norbornadiene (nbd)]. Solution 1H NMR spectroscopic studies and X-ray crystal structures of [Rh(cod)(NH$_3$)$_2$-DB21C7][PF$_6$], [Rh(cod)(NH$_3$)$_2$-DB24C8][PF$_6$], [Rh(nbd)(NH$_3$)$_2$-DB24C8][PF$_6$], [Rh(cod)(NH$_3$)$_2$-DB30C10][PF$_6$], and [[Rh(cod)(NH$_3$)$_2$-2DB36C12][PF$_6$]]$_2$ (H.M. Colquhoun, S.M. Doughty, J.F. Stoddart, A.M.Z. Slawin, D.J. Williams), J. Chem. Soc., Dalton Trans. 1986, 1639–1652. [45]


335. Concept transfer from biology to materials (J.A. Preece, J.F. Stoddart), Nanobiology 1994, 3, 149–166. [28]


J Fraser Stoddart

List of Publications


615. Neoglycoconjugates based on cyclodextrins and calixarenes (D.A. Fulton, J.F. Stoddart), Bioconjugate Chemistry 2001, 12, 655–672. [149]


982. From supramolecular to systems chemistry: complexity emerging out of simplicity (J.F. Stoddart), Angew. Chem. Int. Ed. 2012, 51, 12902–12903. [34]


988. Molecular machines muscle up (C.J. Bruns, J.F. Stoddart), Nat. Nanotech. 2013, 8, 9–10. [58]


List of Publications


1076. A platform for change (J.F. Stoddart), \textit{Supramol. Chem.} \textbf{2015}, \textit{27}, 567–570. \cite{5}


The burgeoning of mechanically interlocked molecules in chemistry (D. Sluysmans, J.F. Stoddart), Trends in Chemistry 2019, 1, 185–197.


[Number of citations according to ISI Web of Science as of 2 December 2019]

**BOOKS**

**EDITED BOOKS**

**ISSUED US PATENTS**
Publication date: 2010-12-09. Publication number: 0310465.

Publication date: 2011-02-18. Publication number: 046463.

10. Nanoporous carbohydrate frameworks and the sequestration and detection of molecules using the same (J.J. Gassensmith, R.A. Smaldone, R.S. Forgan, J.F. Stoddart). 


12. Tetracationic Cyclophanes and Their Use in the Sequestration of Polyaromatic Hydrocarbons by Way of Complexation (J.C. Barnes, A.N. Basuray, A.C. Fahrenbach, H. Li, S. Sampath, J.F. Stoddart) 
Issue date: 2016-03-22. Patent number 9,290,495

13. Compounds and Methods to Isolate Gold (D. Cao, M. Frasconi, Z. J.F. Stoddart) 
Issue date: 2016-07-26. Patent number 9,399,803

Issue date: 2016-09-13. Patent number 9,443,636

15. Modular supramolecular approach for co-crystallization of donors and acceptors into ordered networks (A. Narayanan, A. Shveyd, J.F Stoddart, S. Stupp, C. H. Sue, A. Tayi) 
Issue date: 2016-09-20. Patent number 9,449,731

Issue date: 2017-01-17. Patent number 9,546,169

Issue date: 2017-11-14. Patent number 9,815,764


22. Nanoporous carbohydrate frameworks and the sequestration and detection of molecules using the same (R.S. Forgan, J.J. Gassensmith, R.A. Smaldone, J.F. Stoddart) 
Issue date: 2018-11-13. Patent number 10,125,016

Issue date: 2019-03-12. Patent number 10,228,343

24. Carbohydrate-mediated purification of petrochemicals (K. Hartlieb, J. Holcroft, J. Stoddart)
Issue date: 2019-03-26. Patent number 10,239,044


PROVISIONAL PATENT APPLICATIONS

1. **Serial No.:** 61/314,889  
   **Inventors:** J. F. Stoddart, A. M. Z. Slawin, R. S. Forgan, R. A. Smaldone  
   **Filing Date:** 2010-03-17  
   **Title:** Nanoporous carbohydrate frameworks

2. **Serial No.:** 61/351,704  
   **Inventors:** J. F. Stoddart, J. J. Gassensmith, R. S. Forgan, R. A. Smaldone  
   **Filing Date:** 2010-04-16  
   **Title:** Sequestration and detection of carbon dioxide by a metal organic framework

3. **Serial No.:** 61/314,897  
   **Inventors:** J. F. Stoddart, C.-H. Sue, S. Basu  
   **Filing Date:** 2010-03-17  
   **Title:** A novel purification of CBPQT\(^{4+}\) macrocycle

4. **Serial No.:** 61/488,605  
   **Inventors:** S. I. Stupp, J. F. Stoddart, A. K. Shveyd, A. S. Tayi, C.-H. Sue  
   **Filing Date:** 2011-05-20  
   **Title:** Lock-arm supramolecular ordering

5. **Serial No.:** 61/498,262  
   **Inventors:** S. I. Stupp, J. F. Stoddart, A. K. Shveyd, A. S. Tayi, C.-H. Sue  
   **Filing Date:** 2011-06-17  
   **Title:** Visible pleochroism in a supramolecular material

6. **Serial No.:** 61/498,277  
   **Inventors:** S. I. Stupp, J. F. Stoddart, A. K. Shveyd, A. S. Tayi, C.-H. Sue  
   **Filing Date:** 2011-06-17  
   **Title:** Supramolecular design for ferroelectric charge crystals

7. **Serial No.:** 61/537,852  
   **Inventors:** J. F. Stoddart, A. C. Fahrenbach, J. C. Barnes, S. Sampath, A. N. Basuray, H. Li  
   **Filing Date:** 2011-09-22  
   **Title:** Crystalline bipyridinium radical complexes and uses thereof

8. **Serial No.:** 61/550,748  
   **Inventors:** J. F. Stoddart, S. Grunder, A. C. Whalley, C. Valente  
   **Filing Date:** 2011-10-24  
   **Title:** Molecular gauge blocks for building on the nanoscale

9. **Serial No.:** 61/740,958  
   **Inventors:** J. F. Stoddart, J. C. Barnes, M. Juriček  
   **Filing Date:** 2012-12-21  
   **Title:** Tetracationic cyclophanes and their use in the sequestration of polyaromatic hydrocarbons by way of complexation

10. **Serial No.:** 61/814,066  
    **Inventors:** J. F. Stoddart, Z. Liu, M. Frasconi, D. Cao
Filing Date: 2013-04-19
Title: Compounds and methods to isolate gold

11. Serial No.: 61/883,352
Inventors: J. F. Stoddart, S. Sampath, A. N. Basuray, K. J. Hartlieb, H.-P. Jaquot de Rouville
Filing Date: 2013-09-27
Title: Methods of making diazaperopyrenium dications and uses thereof

12. Serial No.: 62/008,671
Inventors: K. Hartlieb, J. Holcroft, J. F. Stoddart
Filing Date: 2014-06-06
Title: Carbohydrate-mediated purification of petrochemicals

13. Serial No.: 62/045,517
Inventors: O. K. Farha, J. J. Gassensmith, J. F. Stoddart, N. C. Jeong
Filing Date: 2014-09-03
Title: Electrochemical detection of carbon dioxide using a carbohydrate based coordination polymer

14. Serial No.: 62/045,531
Filing Date: 2014-09-03
Title: Redox active triangular organic materials

15. Serial No.: 62/045,511
Filing Date: 2014-09-03
Title: ExCage: Synthesis of viologen-like pyridinium-based cages for the selective capture of polycyclic aromatic hydrocarbons

16. Serial No.: 62/045,514
Inventors: J. F. Stoddart, N. L. Strutt
Disclosure Date: 2014-09-03
Title: A homochiral metal-organic framework with enantiopure pillar[5] arene active domains

17. Serial No.: 62/057,059
Inventors: J. F. Stoddart, X. Hou, C. Ke
Filing Date: 2014-09-29
Title: Supramolecular encrypted fluorescent security ink compositions

18. Serial No.: 62/057,102
Inventors: J. F. Stoddart, X. Hou, C. Ke, R. B. Pettman
Filing Date: 2014-09-29
Title: Supramolecular encrypted fluorescent security ink compositions

19. Serial No.: 62/135,339
Filing Date: 2015-03-19
Title: Rigid naphthalenediimide triangle structures

20. Serial No.: 62/255,490
Inventors: D. Ferris, K. Hartlieb, J. Holcroft, J. F. Stoddart
Filing Date: 2015-11-15
Title: Uptake of pharmaceuticals within cyclodextrin-based porous materials

21. Serial No.: 62/278,200
Inventors: Z. Liu, J.F. Stoddart  
Filing Date: 2016-01-13  
Title: Supramolecular assembly of rigid macrocycles through cooperative hydrogen bond interactions

22. Serial No.: 62/288,701  
Inventors: M. Frasconi, J.F. Stoddart, J. Sun, Y. Wang  
Filing Date: 2016-01-29  
Title: Viologen-based rotaxanes

23. Serial No.: 62/308,998  
Inventors: Z. Liu, S. Nalluri, J.F. Stoddart  
Filing Date: 2016-03-16  
Title: Rigid chiral redox-active isosceles triangles

24. Serial No.: 62/321,290  
Filing Date: 2016-04-12  
Title: Flexible piezoelectric and antiferroelectric haloimidazole crystals

25. Serial No.: 62/382,994  
Filing Date: 2016-09-02  
Title: Flexible piezoelectric and antiferroelectric haloimidazole crystals

26. Serial No.: 62/416,334  
Inventors: D. Ferris, K. Hartlieb, J. Holcroft, J.F. Stoddart  
Filing Date: 2016-11-02  
Title: Loading and bioavailability of ibuprofen/CD-MOF formulations

27. Serial No.: 62/531,115  
Inventors: Z. Liu, J.F. Stoddart, J. Sun  
Filing Date: 2017-07-11  
Title: Mechanically interlocked air-stable radicals

28. Serial No.: 62/535,579  
Inventors: Z. Liu, S. Nalluri, H. Patel, J.F. Stoddart  
Filing Date: 2017-07-21  
Title: Lithiated cyclodextrin metal organic frameworks and methods of making and using the same

29. Serial No.: 62/580,860  
Inventors: H. Patel, J.F. Stoddart  
Filing Date: 2017-11-02  
Title: Troger's base-linked poly(crown ether)s

30. Serial No.: 62/619,561  
Inventors: S. Nalluri, J.F. Stoddart  
Filing Date: 2018-01-19  
Title: Rigid chiral photoluminescent isosceles triangular materials

31. Serial No.: 62/653,301  
Inventors: M. Nguyen, J.F. Stoddart  
Filing Date: 2018-04-05  
Title: Densely charged catenanes

32. Serial No.: 62/658,048
Inventors: I. Roy, J.F. Stoddart
Filing Date: 2018-04-16
Title: Cyclophanes for live-cell imaging

33. Serial No.: 62/680,352
Inventors: Z. Liu, J.F. Stoddart
Filing Date: 2018-06-04
Title: Mixed-valence crystal superstructures

34. Serial No.: 62/691,923
Inventors: M. Nguyen, J.F. Stoddart
Filing Date: 2018-06-29
Title: Densely Charged Catenanes

35. Serial No.: 62/700,614
Inventors: J. Choi, D.J. Kim, J.F. Stoddart, D.-J. Yoo
Filing Date: 2018-07-19
Title: Rechargeable Aluminum Organic Batteries

36. Serial No.: 62/799,229
Inventors: I. Roy, J.F. Stoddart
Filing Date: 2019-01-31
Title: Supramolecular Photoprotection of a Photosensitizer for Safe Lysosomal Delivery and Anticancer Therapy

PENDING US PATENT APPLICATIONS

1. Serial No.: 13/658,973
Inventors: J. F. Stoddart, S. Grunder, A. C. Whalley, C. Valente
Filing Date: 2012-10-24
Title: Molecular gauge blocks for building on the nanoscale

2. Serial No.: 14/733,875
Inventors: J. F. Stoddart, K. J. Hartlieb, J. M. Holcroft
Filing Date: 2015-06-08
Title: Carbohydrate-mediated purification of petrochemicals

3. Serial No.: 14/867,826
Inventors: X. Hou, C. Ke, J.F. Stoddart
Filing Date: 2015-09-28
Title: Supramolecular fluorescent dyes

4. Serial No.: 14/867,953
Inventors: X. Hou, C. Ke, J.F. Stoddart
Filing Date: 2015-09-28
Title: Supramolecular encrypted fluorescent security ink compositions

5. Serial No.: 15/074,161
Filing Date: 2016-03-18
Title: Rigid naphthalenediimide triangle structures

6. Serial No.: 15/218,280
Inventors: D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart
Filing Date: 2016-07-25
Title: Compounds and methods to isolate gold

7. Serial No.: 15/350,975
List of Publications

8. **Serial No.**: 16/032,212  
   **Inventors**: Z. Liu, J.F. Stoddart, J. Sun  
   **Filing Date**: 2018-07-11  
   **Title**: Mechanically interlocked air-stable radicals

9. **Serial No.**: 16/069,940  
   **Inventors**: Z. Liu, J.F. Stoddart  
   **Filing Date**: 2018-07-13  
   **Title**: Supramolecular assembly of rigid macrocycles through cooperative hydrogen bond interactions

10. **Serial No.**: 16/085,436  
    **Inventors**: Z. Liu, S. Nalluri, J.F. Stoddart  
    **Filing Date**: 2018-09-14  
    **Title**: Rigid chiral redox-active isosceles triangular materials

11. **Serial No.**: 16/093,256  
    **Inventors**: V. Dravid, D. Ferris, D. Hong, K.A. Hujsak, M. Owczarek, A. Prokofjevs, J.F. Stoddart  
    **Filing Date**: 2018-10-12  
    **Title**: Flexible piezoelectric and antiferroelectric haloimidazole crystals

12. **Serial No.**: 16/269,311  
    **Inventors**: X. Hou, C. Ke, R. Pettman, J.F. Stoddart  
    **Filing Date**: 2019-02-06  
    **Title**: Supramolecular encrypted fluorescent security ink compositions

PCT APPLICATIONS

1. **Serial No.**: PCT/US2011/028866  
   **Inventors**: J. J. Gassensmith, R. A. Smaldone, R. S. Forgan, J. F. Stoddart  
   **Filing Date**: 2011-03-17  
   **Title**: Nanoporous carbohydrate frameworks and the sequestration and detection of molecules using the same

2. **Serial No.**: PCT/US2012/038896  
   **Filing Date**: 2012-05-21  
   **Title**: Modular supramolecular approach for co-crystallization of donors and acceptors into ordered networks

3. **Serial No.**: PCT/US2012/042978  
   **Filing Date**: 2012-06-18  
   **Title**: Visible pleochroism in a supramolecular material

4. **Serial No.**: PCT/US2013/077144  
   **Inventors**: J. F. Stoddart, J. C. Barnes, M. Juríček  
   **Filing Date**: 2013-12-20  
   **Title**: Tetracationic cyclophanes and their use in the sequestration of polyaromatic hydrocarbons by way of complexation

5. **Serial No.**: PCT/US2014/034697  
   **Inventors**: J. F. Stoddart, Z. Liu, M. Frasconi, D. Cao
Filing Date: 2014-04-18
Title: Compounds and methods to isolate gold

6. **Serial No.:** PCT/US2015/034754  
   **Inventors:** J. F. Stoddart, K. J. Hartlieb, J. M. Holcroft  
   **Filing Date:** 2015-06-08  
   **Title:** Carbohydrate-mediated purification of petrochemicals

7. **Serial No.:** PCT/US2015/052670  
   **Inventors:** X. Hou, C. Ke, J.F. Stoddart  
   **Filing Date:** 2015-09-28  
   **Title:** Supramolecular fluorescent dyes

8. **Serial No.:** PCT/US2015/052694  
   **Inventors:** X. Hou, C. Ke, R. Pettman, J.F. Stoddart  
   **Filing Date:** 2015-09-28  
   **Title:** Supramolecular encrypted fluorescent security ink compositions

9. **Serial No.:** PCT/US2016/023111  
   **Inventors:** A.-J. Avestro, D. Chen, Z. Erno, J.F. Stoddart, J. Sun  
   **Filing Date:** 2016-03-16  
   **Title:** Rigid naphthalenediimide triangle structures

10. **Serial No.:** PCT/US2016/061963  
    **Inventors:** D. Ferris, K. Hartlieb, J. Holcroft, J.F. Stoddart  
    **Filing Date:** 2016-11-15  
    **Title:** Uptake of pharmaceuticals within cyclodextrin-based porous materials

11. **Serial No.:** PCT/US2017/013301  
    **Inventors:** Z. Liu, J.F. Stoddart  
    **Filing Date:** 2017-01-13  
    **Title:** Supramolecular assembly of rigid macrocycles through cooperative hydrogen bond interactions

12. **Serial No.:** PCT/US2017/015299  
    **Inventors:** M. Frasconi, J.F. Stoddart, J. Sun, Y. Wang  
    **Filing Date:** 2017-01-27  
    **Title:** Viologen-based rotaxanes

13. **Serial No.:** PCT/US2017/022668  
    **Inventors:** Z. Liu, S. Nalluri, J.F. Stoddart  
    **Filing Date:** 2017-03-16  
    **Title:** Rigid chiral redox-active isoceles triangular materials

14. **Serial No.:** PCT/US2017/027170  
    **Inventors:** V. Dravid, D. Ferris, D. Hong, K.A. Hujsak, M. Owczarek, A. Prokofjevs, J.F. Stoddart  
    **Filing Date:** 2017-04-12  
    **Title:** Flexible piezoelectric and antiferroelectric haloimidazole crystals

15. **Serial No.:** PCT/US2018/041551  
    **Inventors:** Z. Liu, J.F. Stoddart, J. Sun  
    **Filing Date:** 2018-07-11  
    **Title:** Mechanically interlocked air-stable radicals

16. **Serial No.:** PCT/US2018/043217  
    **Inventors:** Z. Liu, S. Nalluri, H. Patel, J.F. Stoddart
Filing Date: 2018-07-23
Title: Lithiated cyclodextrin metal organic frameworks and methods of making and using the same

17. **Serial No.:** PCT/US2018/059046
**Inventors:** H. Patel, J.F. Stoddart
**Filing Date:** 2018-11-02
**Title:** Troger’s base-linked poly(crown ether)s

18. **Serial No.:** PCT/US2019/014415
**Inventors:** S. Nalluri, J.F. Stoddart
**Filing Date:** 2019-01-21
**Title:** Rigid chiral photoluminescent isosceles triangular materials

19. **Serial No.:** PCT/US2019/026095
**Inventors:** M. Nguyen, J.F. Stoddart
**Filing Date:** 2019-04-05
**Title:** Densely charged catenanes

20. **Serial No.:** PCT/US2019/027713
**Inventors:** I. Roy, J.F. Stoddart
**Filing Date:** 2019-04-16
**Title:** Cyclophanes for live-cell imaging

**ISSUED FOREIGN PATENTS**


1. **Serial No.:** EP 13866011.3  
   **Country:** EPO  
   **Inventors:** J. F. Stoddart, J. C. Barnes, M. Juríček  
   **Filing Date:** 2015-06-24  
   **Title:** Tetracationic cyclophanes and their use in the sequestration of polyaromatic hydrocarbons by way of complexation

2. **Serial No.:** CA 2,909,203  
   **Country:** Canada  
   **Inventors:** D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart  
   **Filing Date:** 2015-10-08  
   **Title:** Compounds and Methods to Isolate Gold

3. **Serial No.:** PH 1-2015-502366  
   **Country:** Philippines  
   **Inventors:** D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart  
   **Filing Date:** 2015-10-02  
   **Title:** Compounds and Methods to Isolate Gold

4. **Serial No.:** PERU 002159-2015/DIN  
   **Country:** Peru  
   **Inventors:** D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart  
   **Filing Date:** 2015-10-15  
   **Title:** Compounds and Methods to Isolate Gold

5. **Serial No.:** CN 201480023847.X  
   **Country:** China  
   **Inventors:** D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart  
   **Filing Date:** 2015-10-27  
   **Title:** Compounds and Methods to Isolate Gold

6. **Serial No.:** EP 14785085.3  
   **Country:** EPO  
   **Inventors:** D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart  
   **Filing Date:** 2015-11-04  
   **Title:** Compounds and Methods to Isolate Gold

7. **Serial No.:** UZ IAP20150425  
   **Country:** Uzbekistan  
   **Inventors:** D. Cao, M. Frasconi, Z. Liu, J.F. Stoddart  
   **Filing Date:** 2015-11-04  
   **Title:** Compounds and Methods to Isolate Gold

8. **Serial No.:** CN 201780025678.7  
   **Country:** China  
   **Inventors:** Z. Liu, S. Nalluri, J.F. Stoddart  
   **Filing Date:** 2017-03-16  
   **Title:** Rigid Chiral Redox-Active Isosceles Triangular Materials

9. **Serial No.:** SA 517382329  
   **Country:** Saudi Arabia  
   **Inventors:** A.-J. Avestro, D. Chen, Z. Erno, J.F. Stoddart, J. Sun  
   **Filing Date:** 2017-09-17
Title: Rigid Napthalenediimide Triangle Structures

10. **Serial No.**: ARAB EMIRATES P60011  
**Country**: Arab Emirates  
**Inventors**: A.-J. Avestro, D. Chen, Z. Erno, J.F. Stoddart, J. Sun  
**Filing Date**: 2017-09-19  
**Title**: Rigid Napthalenediimide Triangle Structures

11. **Serial No.**: EP16765820.2  
**Country**: EPO  
**Inventors**: A.-J. Avestro, D. Chen, Z. Erno, J.F. Stoddart, J. Sun  
**Filing Date**: 2017-10-27  
**Title**: Rigid Napthalenediimide Triangle Structures

12. **Serial No.**: CN 201680028163.8  
**Country**: China  
**Inventors**: A.-J. Avestro, D. Chen, Z. Erno, J.F. Stoddart, J. Sun  
**Filing Date**: 2017-11-15  
**Title**: Rigid Napthalenediimide Triangle Structures

13. **Serial No.**: SA 518392119  
**Country**: Saudi Arabia  
**Inventors**: D. Ferris, K. Hartlieb, J. Holcroft, J.F. Stoddart  
**Filing Date**: 2018-07-31  
**Title**: Uptake of Pharmaceuticals within Cyclodextrin-based Porous Materials

14. **Serial No.**: CN 201780015076.3  
**Country**: China  
**Inventors**: M. Frasconi, J.F. Stoddart, J. Sun, Y. Wang  
**Filing Date**: 2018-09-04  
**Title**: Viologen-Based Rotaxanes

15. **Serial No.**: SA 518400208  
**Country**: Saudi Arabia  
**Inventors**: V. Dravid, D. Ferris, D. Hong, K.A. Hujsak, M. Owczarek, A. Prokofjevs, J.F. Stoddart  
**Filing Date**: 2018-10-10  
**Title**: Flexible Piezoelectric and Antiferroelectric Haloimidazole Crystals

16. **Serial No.**: SA 518400208  
**Country**: Saudi Arabia  
**Inventors**: V. Dravid, D. Ferris, D. Hong, K.A. Hujsak, M. Owczarek, A. Prokofjevs, J.F. Stoddart  
**Filing Date**: 2018-10-10  
**Title**: Flexible Piezoelectric and Antiferroelectric Haloimidazole Crystals

17. **Serial No.**: EP 17783042.9  
**Country**: EPO  
**Inventors**: V. Dravid, D. Ferris, D. Hong, K.A. Hujsak, M. Owczarek, A. Prokofjevs, J.F. Stoddart  
**Filing Date**: 2018-11-12  
**Title**: Flexible Piezoelectric and Antiferroelectric Haloimidazole Crystals

18. **Serial No.**: CN 201780031574.7  
**Country**: China  
**Inventors**: V. Dravid, D. Ferris, D. Hong, K.A. Hujsak, M. Owczarek, A. Prokofjevs, J.F. Stoddart  
**Filing Date**: 2018-11-22  
**Title**: Flexible Piezoelectric and Antiferroelectric Haloimidazole Crystals
19. **Serial No.:** TO BE PROVIDED  
**Country:** China  
**Inventors:** K. Hartlieb, J. Holcroft, J.F. Stoddart  
**Filing Date:** TO BE PROVIDED  
**Title:** Carbohydrate-Mediated Purification of Petrochemicals

20. **Serial No.:** CN201680072938.1  
**Country:** China  
**Inventors:** D. Ferris, K. Hartlieb, J. Holcroft, J.F. Stoddart  
**Filing Date:** TO BE PROVIDED  
**Title:** Uptake of Pharmaceuticals within Cyclodextrin-based Porous Materials

21. **Serial No.:** EP 16865255.0  
**Country:** EPO  
**Inventors:** D. Ferris, K. Hartlieb, J. Holcroft, J.F. Stoddart  
**Filing Date:** TO BE PROVIDED  
**Title:** Uptake of Pharmaceuticals within Cyclodextrin-based Porous Materials

22. **Serial No.:** TO BE ASSIGNED  
**Country:** Saudi Arabia  
**Inventors:** Z. Liu, S. Nalluri, J.F. Stoddart  
**Filing Date:** TO BE PROVIDED  
**Title:** Rigid Chiral Redox-Active Isosceles Triangular Materials