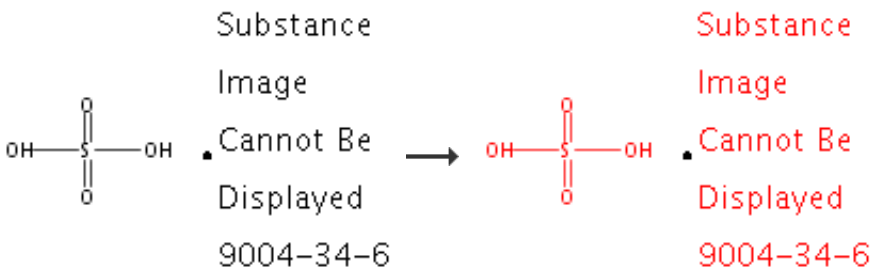
**1. Single Step**




**81%**

Overview

**Steps/Stages**

1.1 R:$NH_3$, C:$PhCO_2Na$, S:$H_2O$, 12 h, 180°C, 1.2 MPa

**Notes**

high pressure reactor used, alternative preparation shown, thermal, Reactants: 1, Reagents: 1, Catalysts: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

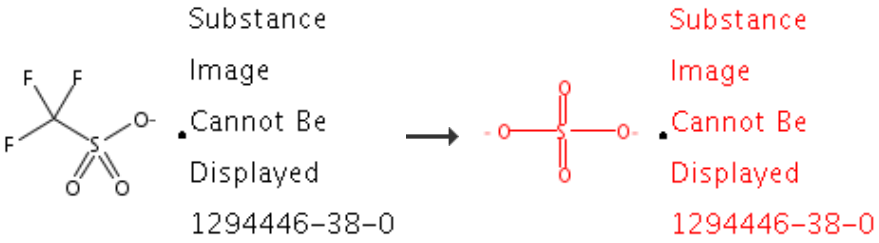
Chitosan analog produced via amination of monosulfate of cellulose or hemicellulose

By Yin, Yingwu et al

From Faming Zhuanli Shenqing, 108530546, 14 Sep 2018



**2. Single Step**




**80%**

Overview

**Steps/Stages**

1.1 R:$(Bu_4N^+)_2 \cdot SO_4^{2+}$, S:$H_2O$, S:MeCN

**Notes**

Reactants: 1, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Anion Exchange Renders Hydrophobic Capsules and Cargoes Water-Soluble

By Percastegui, Edmundo G. et al

From Angewandte Chemie, International Edition, 56(31), 9136-9140; 2017

Reaction Protocol

**Procedure** 1. Dissolve reactant in $CH_3CN$ and add tetrabutylammonium sulfate ($TBA_2SO_4$) solution 50wt % in $H_2O$ (1.5 equivalents relative to cage).
2. Centrifuge the mixture and wash the precipitate thoroughly with $CH_3CN$:$H_2O$ (9:1).

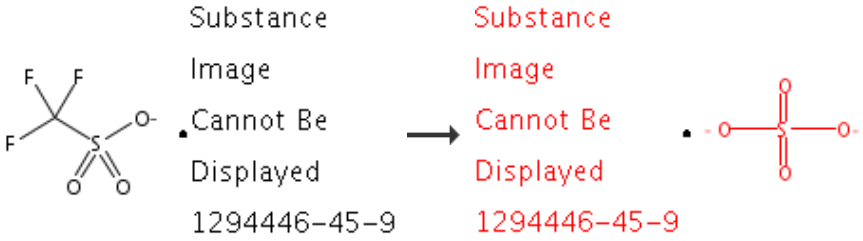
View more...

**Available Experimental Data** $^1$H NMR, $^{13}$C NMR, Mass Spec, State

View with MethodsNow



**3. Single Step**




**75%**

Overview

**Steps/Stages**

1.1 R:$(Bu_4N^+)_2 \cdot SO_4^{2+}$, S:$H_2O$, S:MeCN

**Notes**

Reactants: 1, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Anion Exchange Renders Hydrophobic Capsules and Cargoes Water-Soluble

By Percastegui, Edmundo G. et al

From Angewandte Chemie, International Edition, 56(31), 9136-9140; 2017

Reaction Protocol

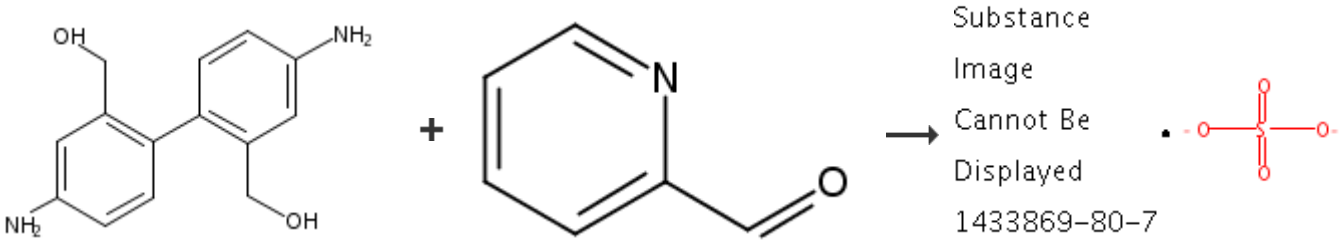
**Procedure** 1. Dissolve reactant in $CH_3CN$ and add tetrabutylammonium sulfate solution 50wt% in $H_2O$ (1.5 equivalents relative to cage).
2. Centrifuge the mixture and wash the precipitate thoroughly with $CH_3CN$:$H_2O$ (9:1).

View more...

**Available Experimental Data** $^1$H NMR, Mass Spec, State

View with MethodsNow

**4. Single Step**




**72%**

Overview

**Steps/Stages**

1.1 R:$FeSO_4$, S:$H_2O$, S:MeOH, 20 h, 20°C

**Notes**

product depends on solvent,temperature, Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Selective Assembly and Disassembly of a Water-Soluble Fe10L15 Prism

By Zarra, Salvatore et al

From Angewandte Chemie, International Edition, 52(18), 4837-4840; 2013

Reaction Protocol

**Procedure**

1. Add 2,2'-bis(hydroxymethyl)benzidine (1.5 equivalents), 2-formylpyridine (3.0 equivalents) and iron (II) sulfate heptahydrate (1 equivalent) to a 50 mL Schlenk flask containing a degassed methanol/water mixture (90:10 ratio, 5 mL).
2. Stir the reaction mixture at 20 °C for twenty hours.

View more...

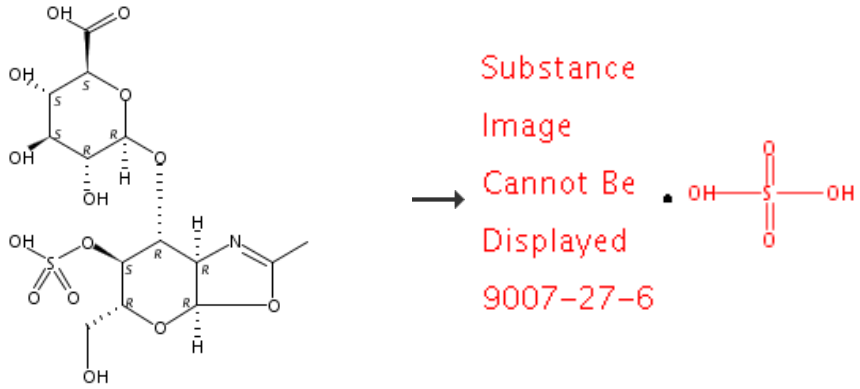
**Available Experimental Data**

$^{1}$H NMR, $^{13}$C NMR, Elemental Analysis, State

View with MethodsNow



**5. Single Step**




**75%**

Overview

**Steps/Stages**

1.1 C:37326-33-3, S:$H_2O$, 1.5 h, 30°C, pH 7.5

**Notes**

biotransformation, enzymic, yield depends on cat. and time,polymerization, Reactants: 1, Catalysts: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

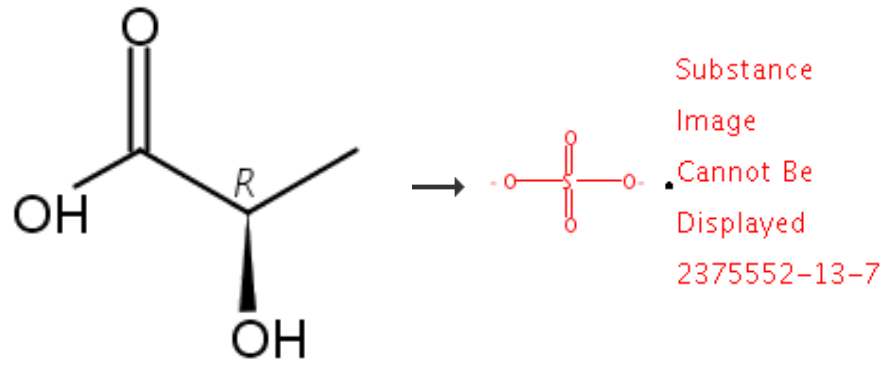
A hyaluronidase supercatalyst for the enzymatic polymerization to synthesize glycosaminoglycans

By Kobayashi, Shiro et al

From Chemistry - A European Journal, 12(23), 5962-5971; 2006



**6. Single Step**




**60%**

Overview

**Steps/Stages**

**Notes**

1.1 R:

Substance
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Displayed
568584-66-7

R:HCl, S:$H_2O$, 1 h, rt, pH 3.8

Reactants: 1, Reagents: 3, Solvents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Enantioselective recognition of chiral guests by the water-soluble Chiral [Mo132O372(H2O)72(x-Lactate)30]42- nanocapsules

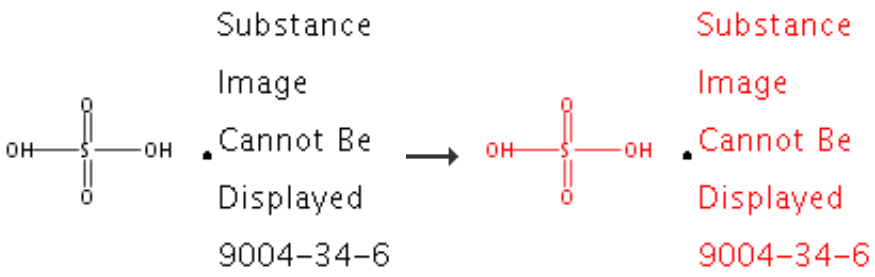
By Watfa, Nancy et al

From ChemRxiv, , 1-28; 2019

1.2 R:$NH_4Cl$, 10 min, rt



**7. Single Step**




**62%**

Overview

**Steps/Stages**

1.1 R:$(NH_4)_2SO_4$, C:$PhCO_2Na$, S:$H_2O$, 24 h, 180°C, 1.2 MPa

**Notes**

high pressure reactor used, alternative preparation shown, thermal, Reactants: 1, Reagents: 1, Catalysts: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Chitosan analog produced via amination of monosulfate of cellulose or hemicellulose

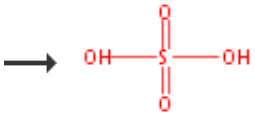
By Yin, Yingwu et al

From Faming Zhuanli Shenqing, 108530546, 14 Sep 2018



**8. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

**60%**

Overview

**Steps/Stages**

1.1 R:$H_2SO_4$, S:$H_2O$, 105 min, 55°C
1.2 S:$H_2O$, 4°C

**Notes**

optimization study, optimized on temperature, optimized on time, optimized on stoichiometry of reagent, inverse addition (stage 2), Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

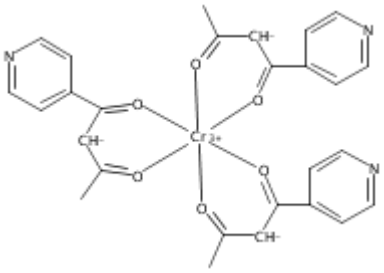
Analysis of the sulfuric acid hydrolysis of wood pulp for cellulose nanocrystal production: A central composite design study

By Dong, Shuping et al

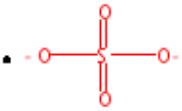
From Industrial Crops and Products, 93, 76-87; 2016



**9. Single Step**



Substance Image Cannot Be Displayed 2127840-28-0



**59%**

Overview

**Steps/Stages**

1.1 R:$CuSO_4 \cdot 5H_2O$, S:$H_2O$, S:MeOH, S:$CH_2Cl_2$, 1 h

**Notes**

Reactants: 1, Reagents: 1, Solvents: 3, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

[CrIII8MII6]n+ (MII = Cu, Co) face-centered, metallo-supramolecular cubes

By O'Connor, H. M. et al

From CrystEngComm, 18(26), 4914-4920; 2016

Reaction Protocol

**Procedure**

1. Add $Cu(SO_4)\cdot 5H_2O$ (50 mg, 0.2 mmol) in 3 mL of water to a solution of the metalloligand $[CrL_3]$ (108 mg, 0.2 mmol) in 20 mL of dichloromethane/tetrahydrofuran (1 : 1 v/v).
2. Stir the solution for 1 hour.

View more...

**Available Experimental Data**

Crystal Structure Data, Elemental Analysis, State

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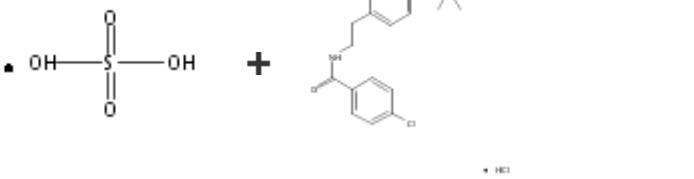
**10. Single Step**

Substance Image Cannot Be Displayed 9007-27-6

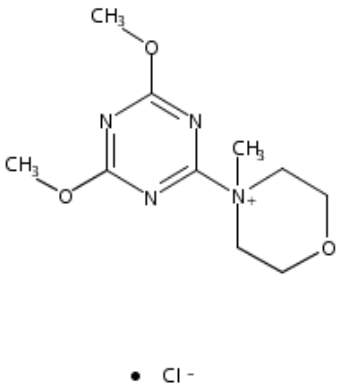


Substance Image Cannot Be Displayed 2378143-29-2

Overview

**Steps/Stages**

1.1 R:



• Cl⁻

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

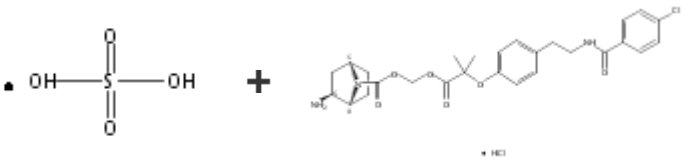
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**11. Single Step**

Substance Image Cannot Be Displayed 9007-27-6

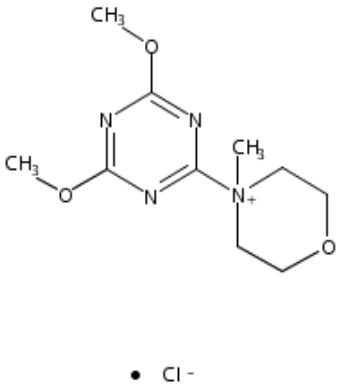


Substance Image Cannot Be Displayed 2378143-27-0

Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

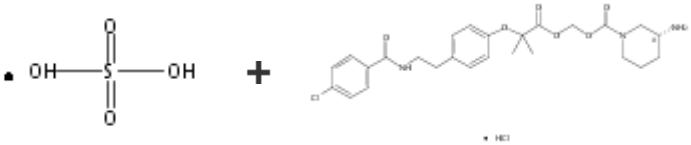
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**12. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



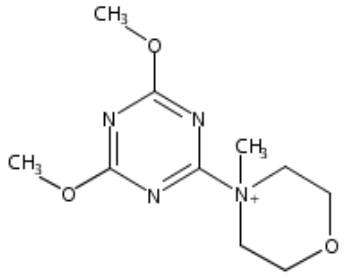
Substance Image Cannot Be Displayed 2378143-25-8

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

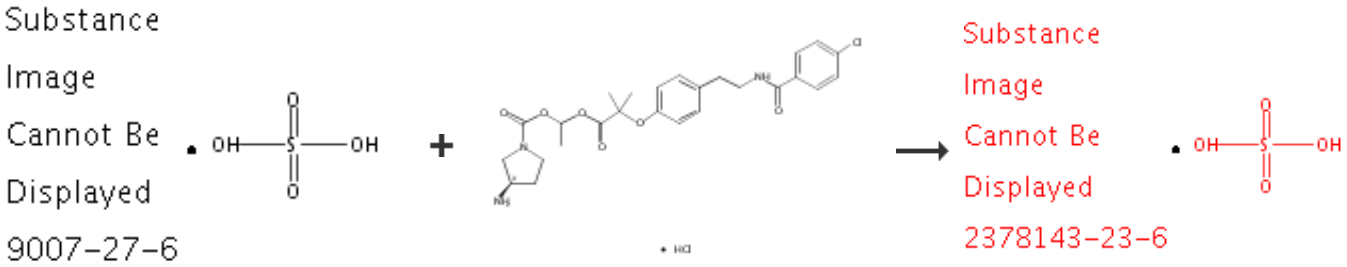
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**13. Single Step**

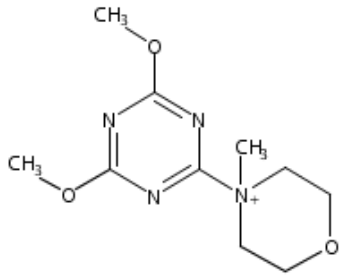



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

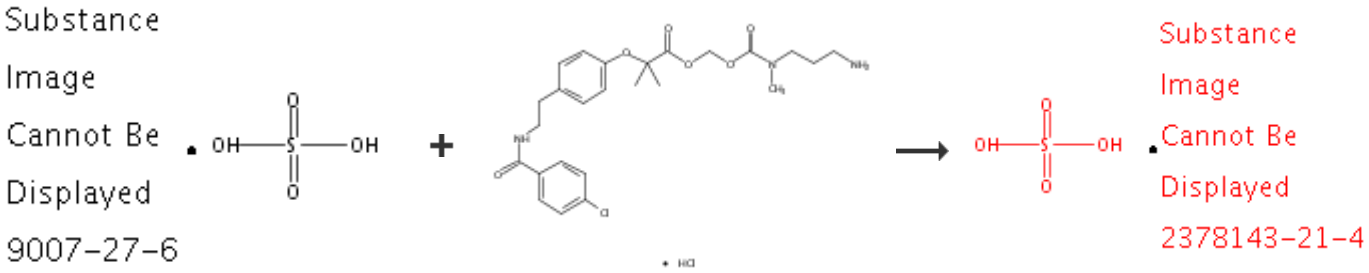
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



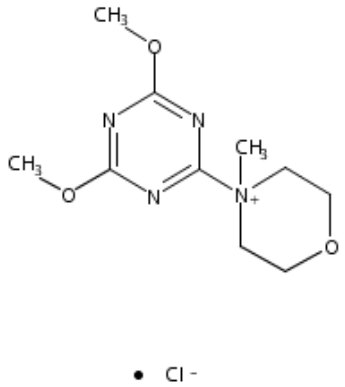
**14. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

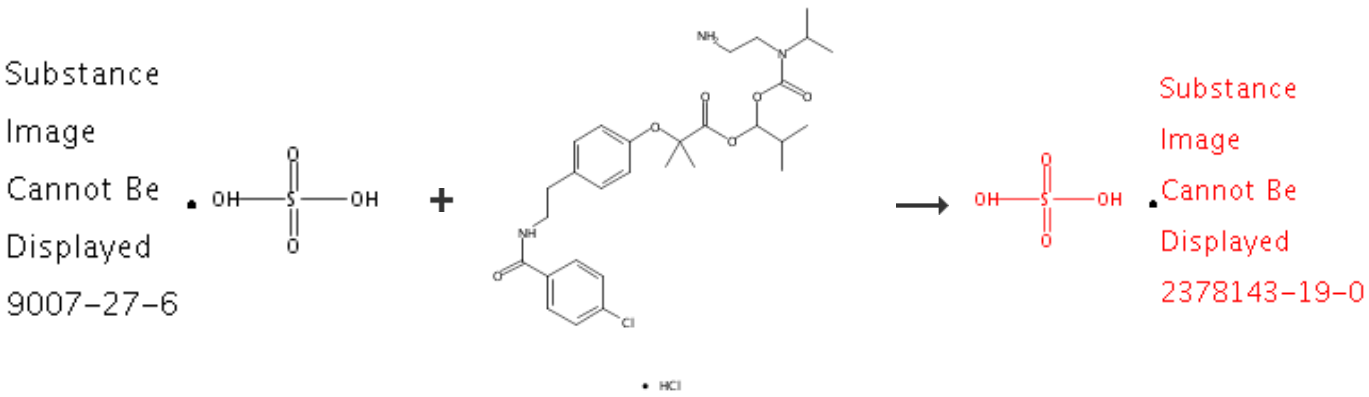
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**15. Single Step**

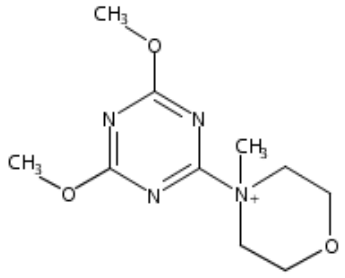



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

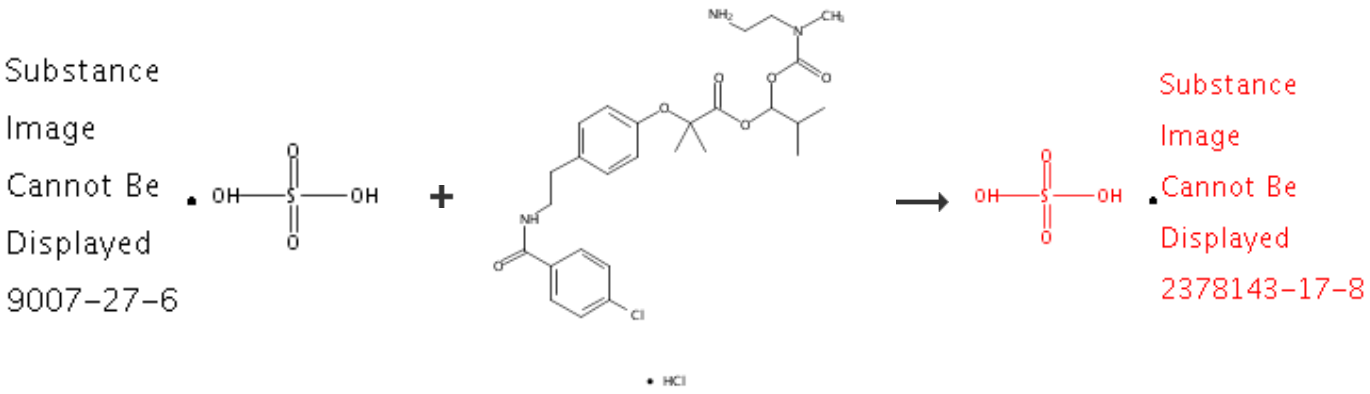
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



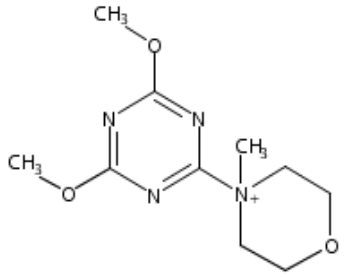
**16. Single Step**




Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

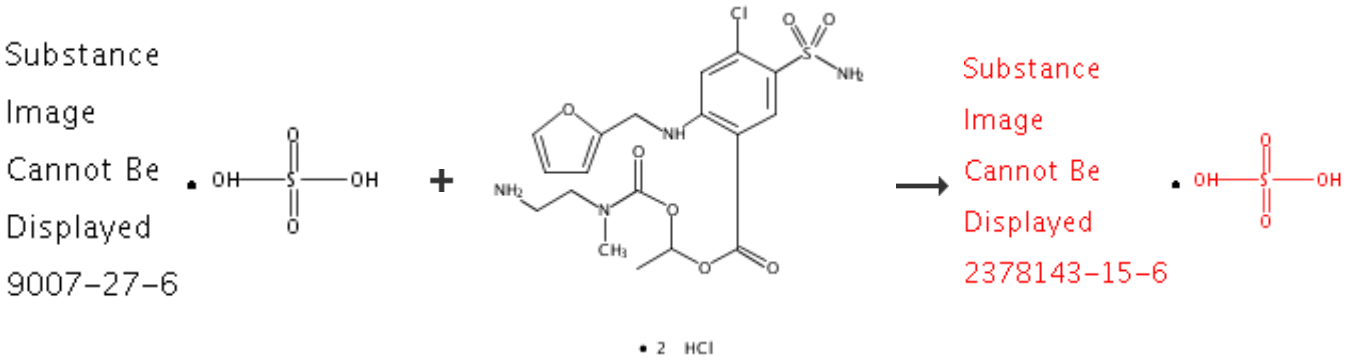
**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

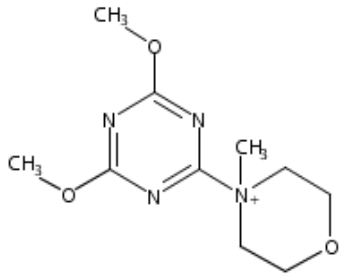
**17. Single Step**




Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

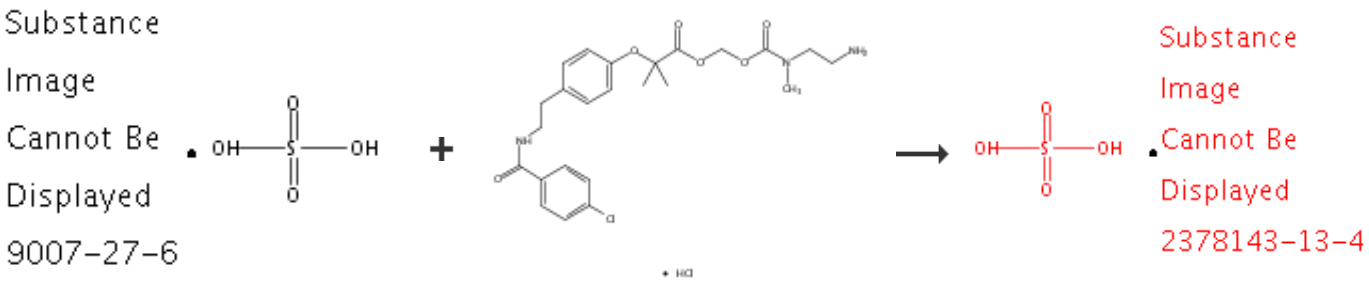
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**18. Single Step**

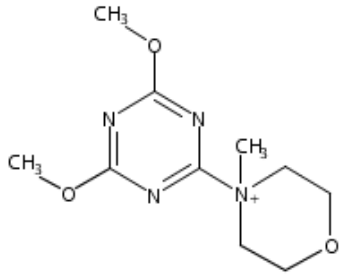



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

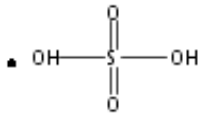
By Kobayashi, Nobuo et al

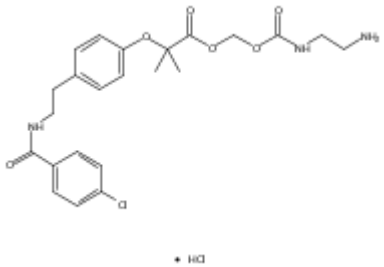
From PCT Int. Appl., 2019189876, 03 Oct 2019

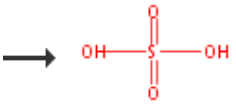


**19. Single Step**

Substance Image Cannot Be Displayed 9007-27-6







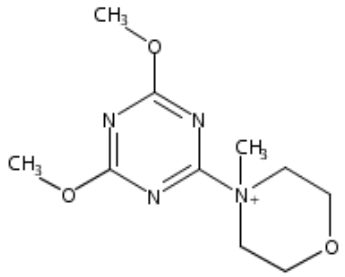
Substance Image Cannot Be Displayed 2378143-11-2

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

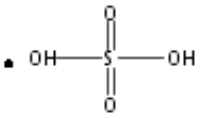
By Kobayashi, Nobuo et al

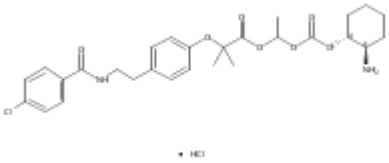
From PCT Int. Appl., 2019189876, 03 Oct 2019



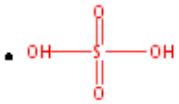
**20. Single Step**

Substance Image Cannot Be Displayed 9007-27-6





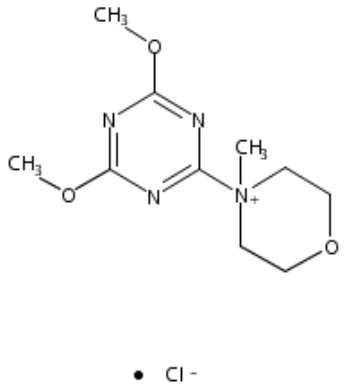
Substance Image Cannot Be Displayed 2378143-09-8



Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

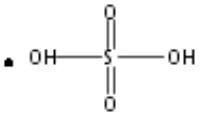
By Kobayashi, Nobuo et al

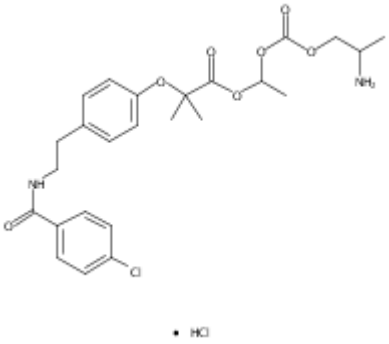
From PCT Int. Appl., 2019189876, 03 Oct 2019



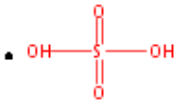
**21. Single Step**

Substance Image Cannot Be Displayed 9007-27-6





Substance Image Cannot Be Displayed 2378143-07-6

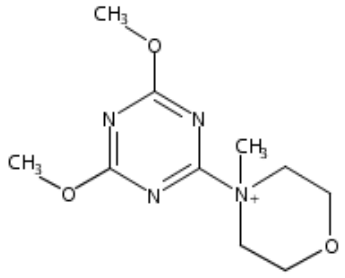


Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

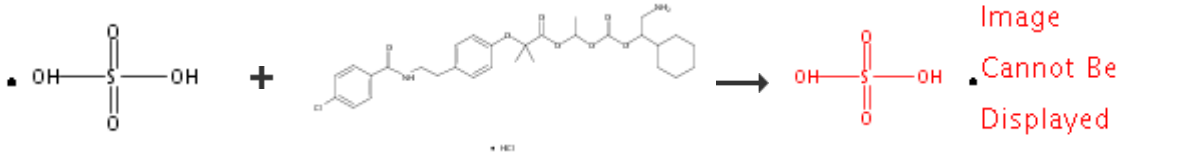
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**22. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



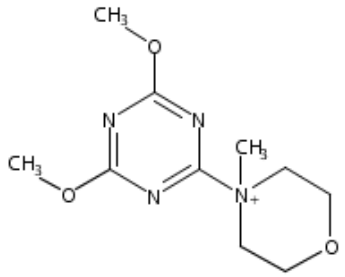
Substance Image Cannot Be Displayed 2378143-05-4

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

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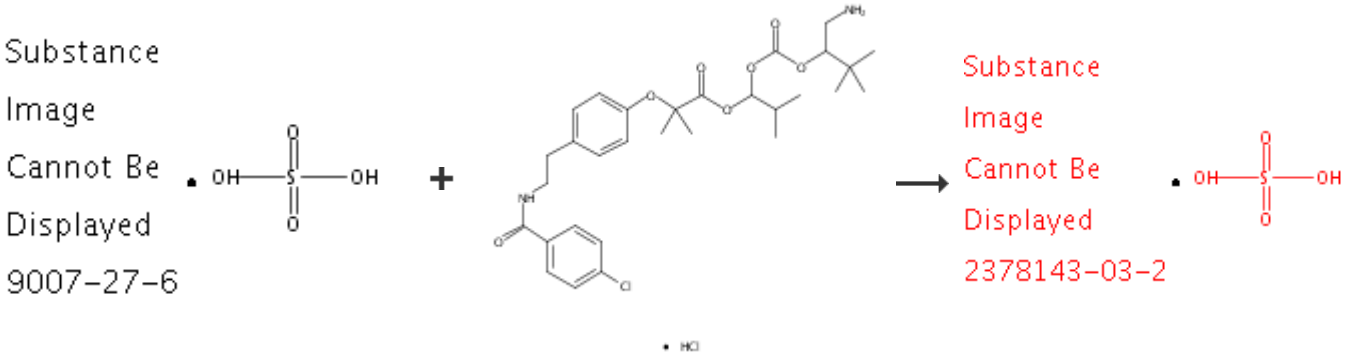
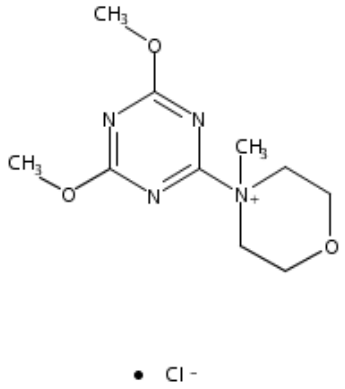
**23. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

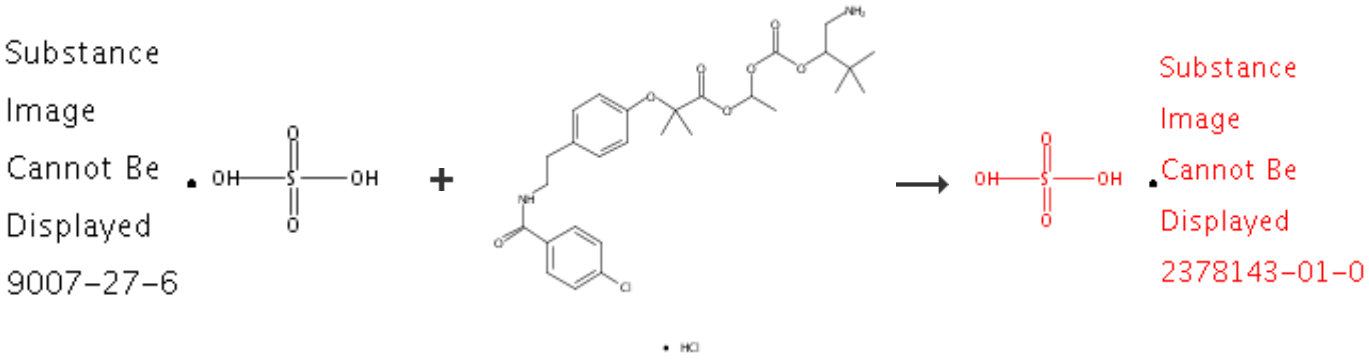
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**24. Single Step**

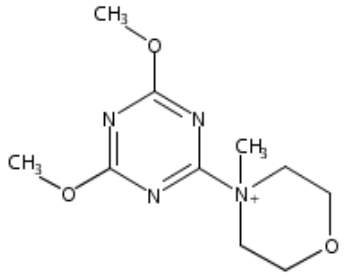



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

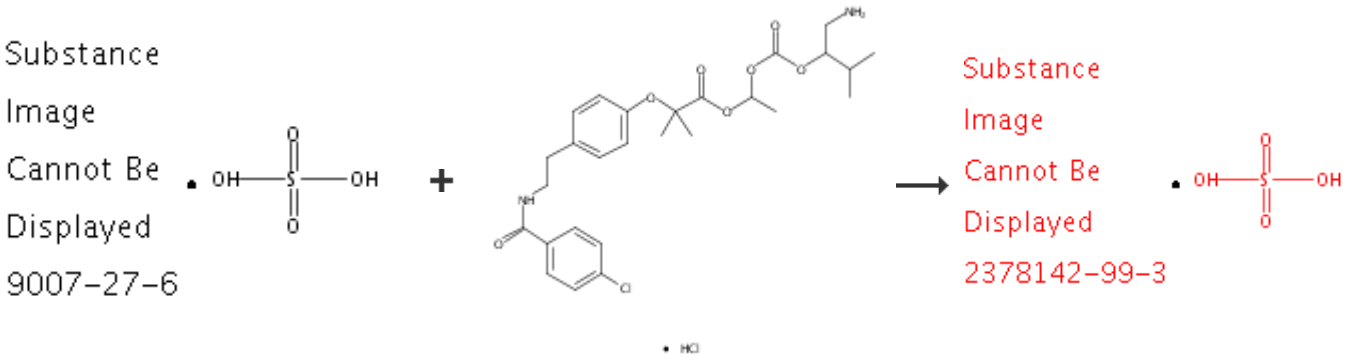
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



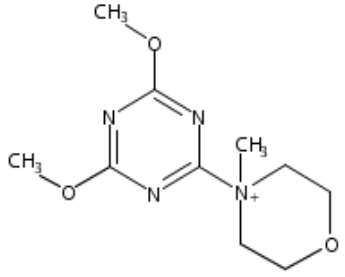
**25. Single Step**




Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

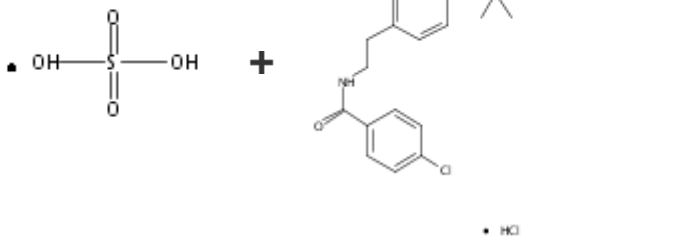
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

**26. Single Step**

Substance Image Cannot Be Displayed 9007-27-6

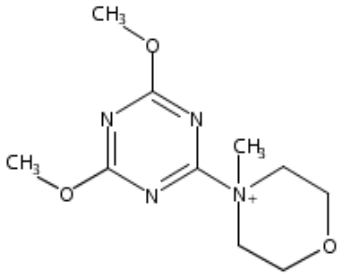


Substance Image Cannot Be Displayed 2378142-95-9

Overview

**Steps/Stages**

1.1 R:



S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

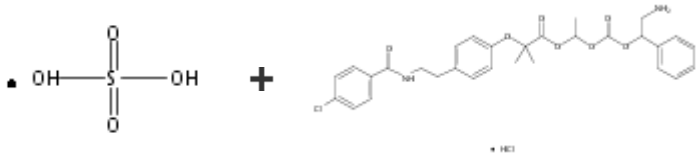
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**27. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



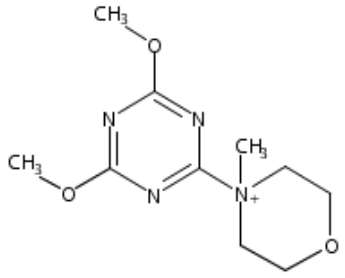
Substance Image Cannot Be Displayed 2378142-93-7

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

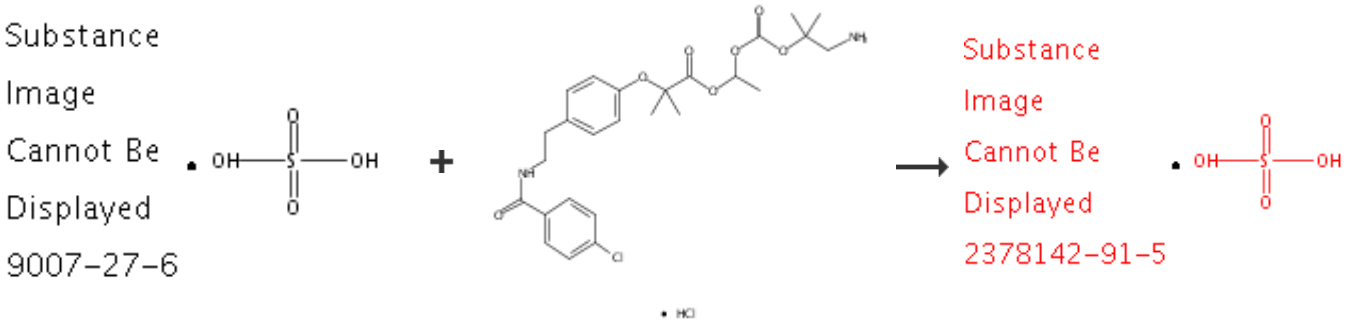
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**28. Single Step**

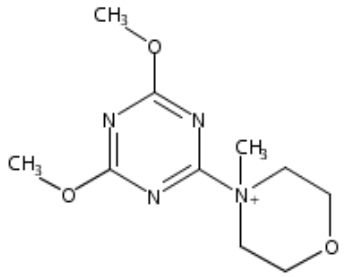



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

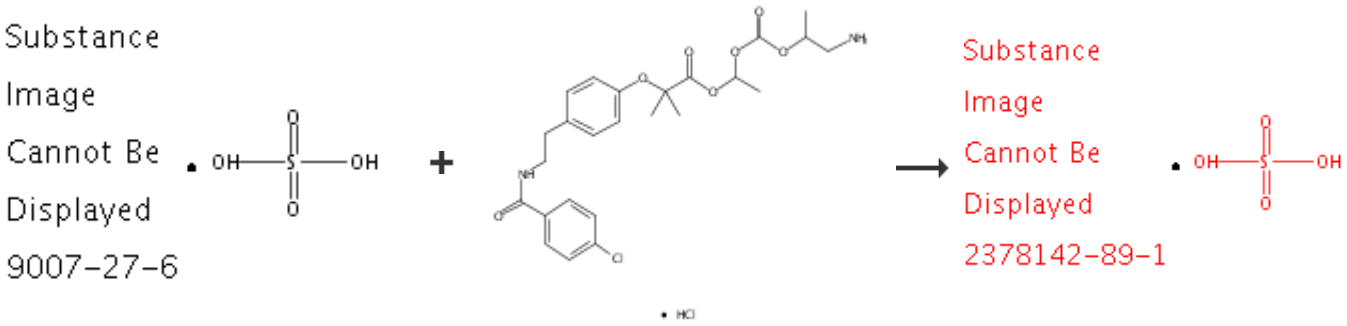
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



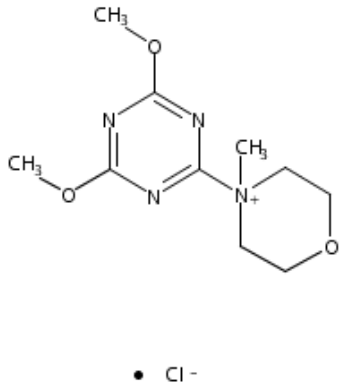
**29. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

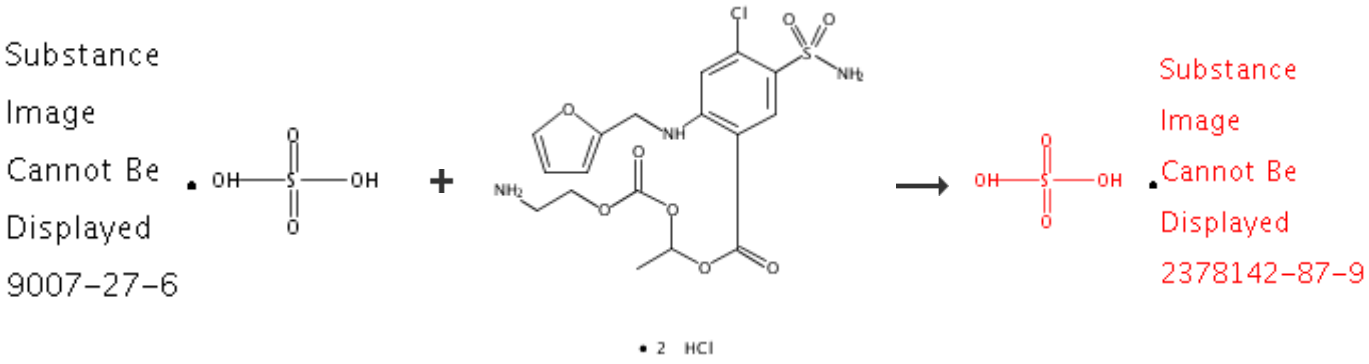
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**30. Single Step**

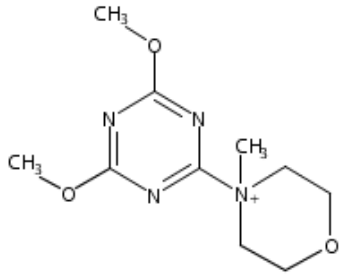



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

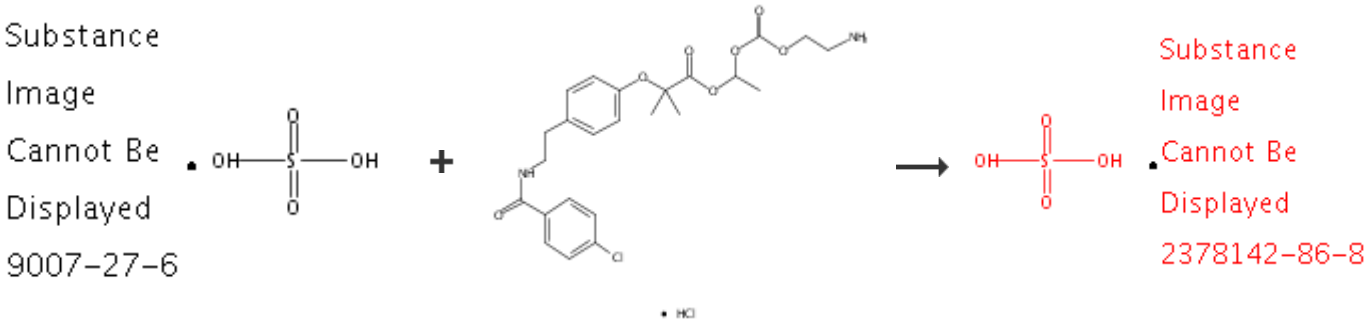
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**31. Single Step**

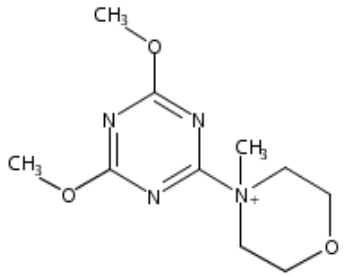



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

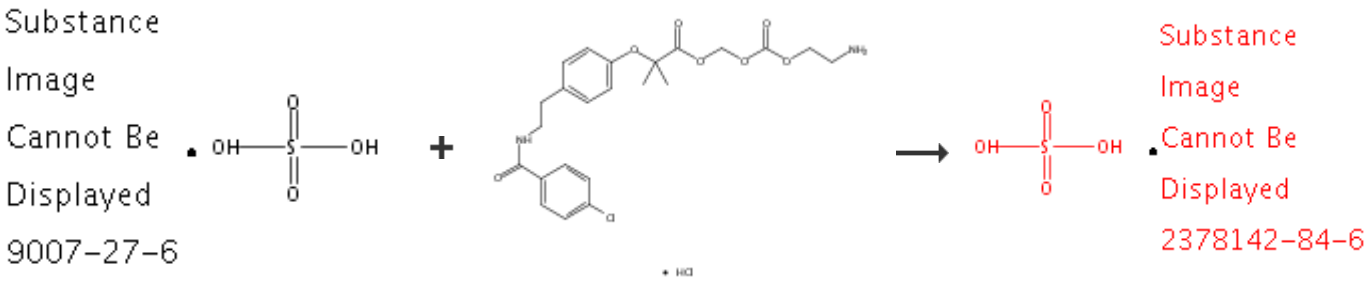
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



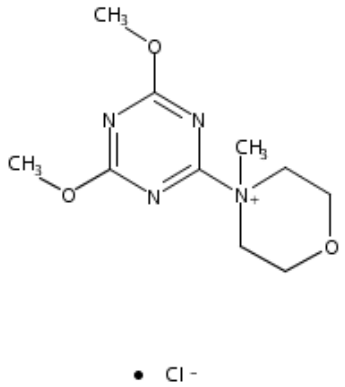
**32. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

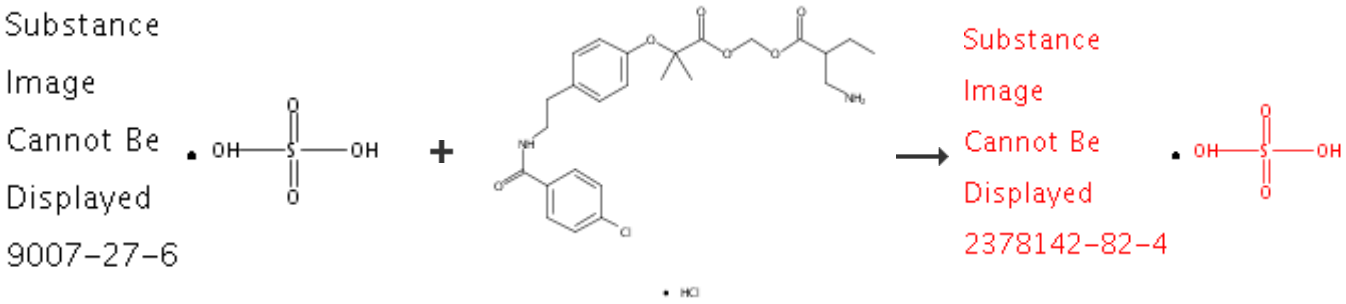
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**33. Single Step**

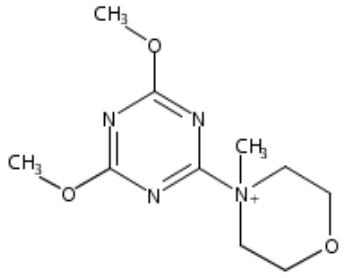



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

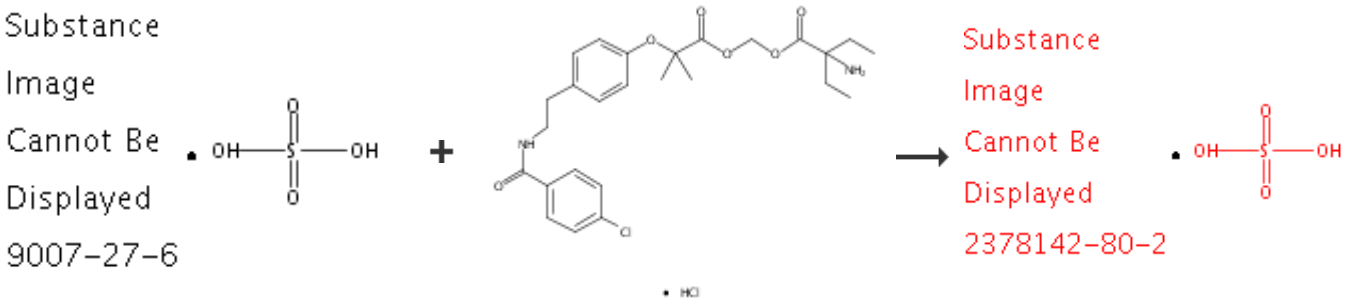
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



**34. Single Step**

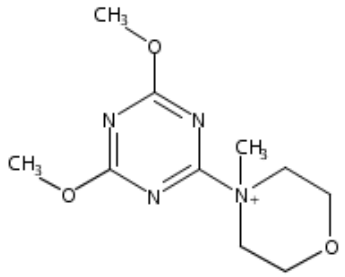



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

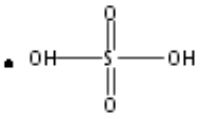
From PCT Int. Appl., 2019189876, 03 Oct 2019

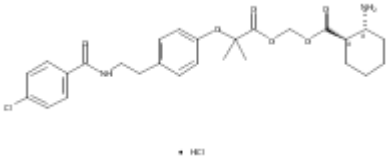
S:$H_2O$, S:EtOH, overnight, rt



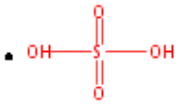
**35. Single Step**

Substance Image Cannot Be Displayed 9007-27-6





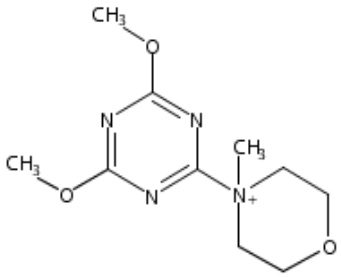
Substance Image Cannot Be Displayed 2378142-78-8



Overview

**Steps/Stages**

1.1 R:



S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

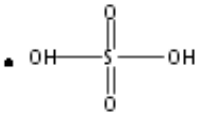
By Kobayashi, Nobuo et al

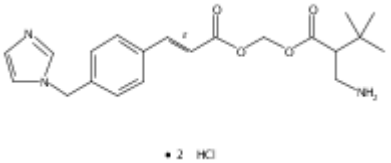
From PCT Int. Appl., 2019189876, 03 Oct 2019



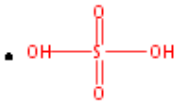
**36. Single Step**

Substance Image Cannot Be Displayed 9007-27-6





Substance Image Cannot Be Displayed 2378130-12-0

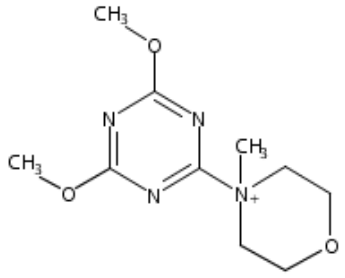


Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

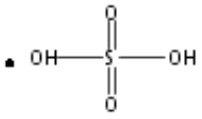
S:$H_2O$, S:EtOH, overnight, rt



**37. Single Step**

Substance Image Cannot Be Displayed

9007-27-6



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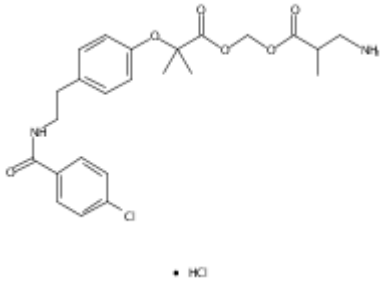
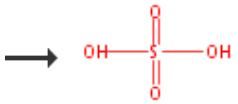


• HCl



Substance Image Cannot Be Displayed

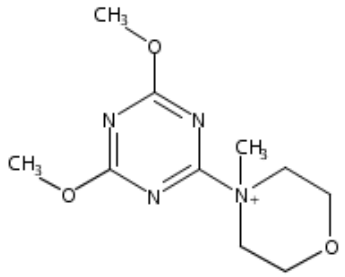
2378129-65-6

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

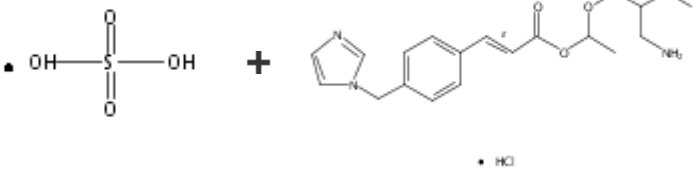
From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt

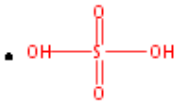


**38. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



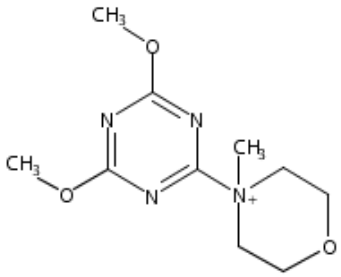
Substance Image Cannot Be Displayed 2378129-62-3



Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

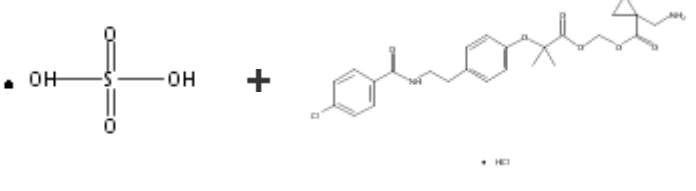
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

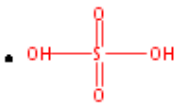


**39. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



Substance Image Cannot Be Displayed 2378129-37-2

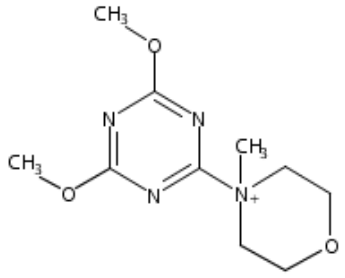


Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



**40. Single Step**

Substance

Image

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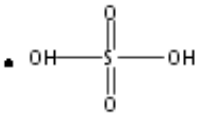
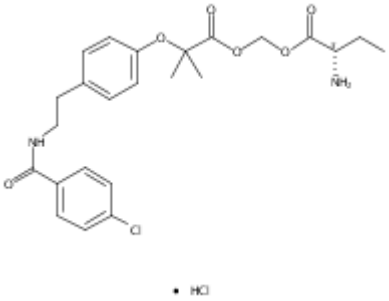
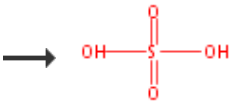




• HCl



Substance

Image

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Displayed

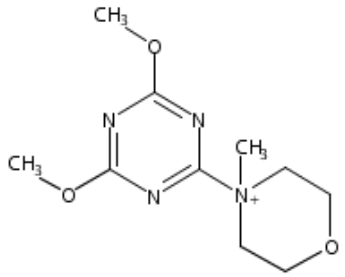
2378129-17-8

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

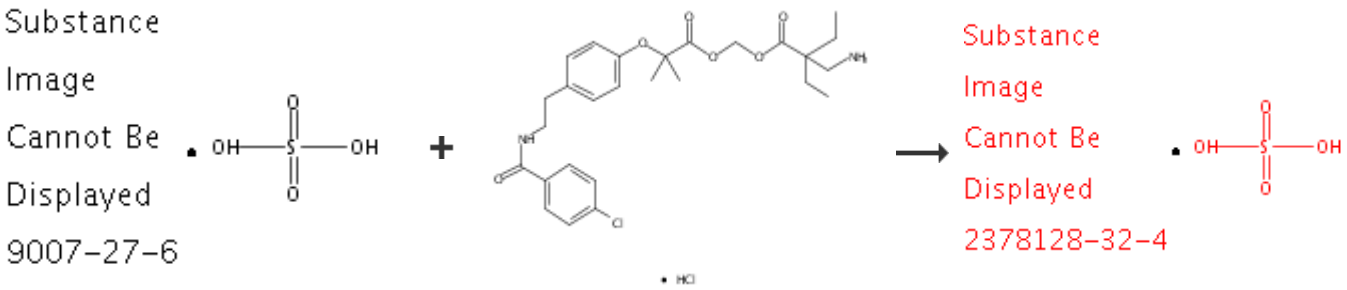
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



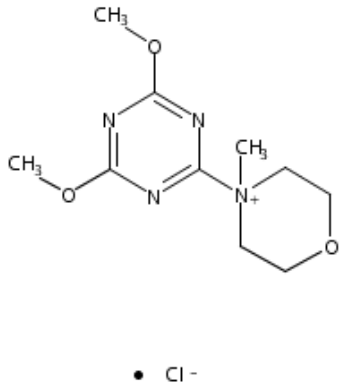
**41. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

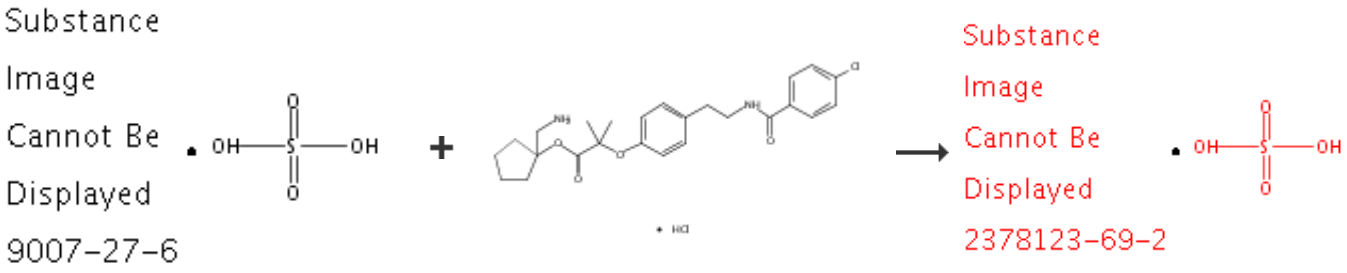
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**42. Single Step**

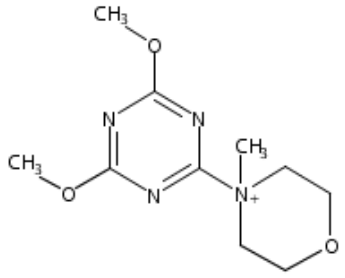



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



**43. Single Step**

Substance

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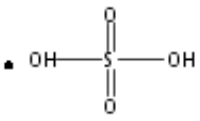
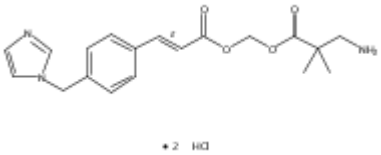
9007-27-6





Substance

Image

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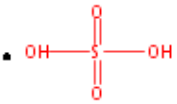
2378123-31-8

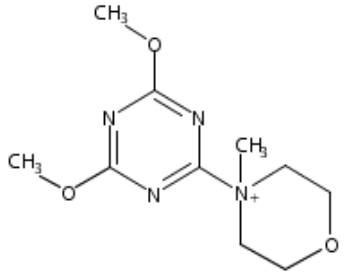


Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

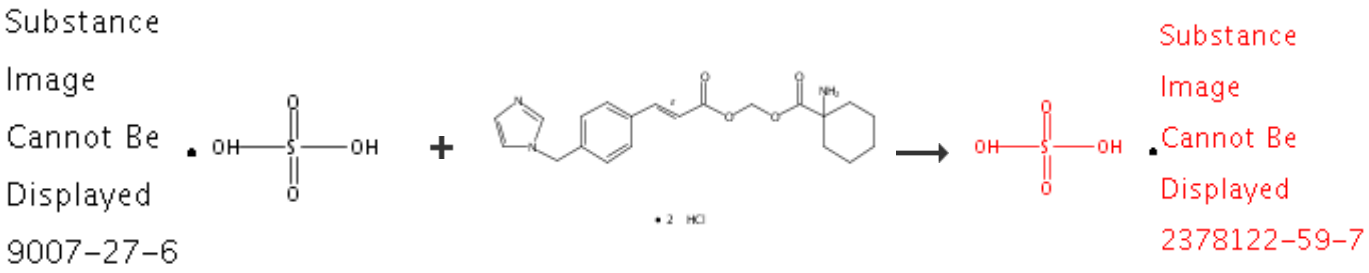
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



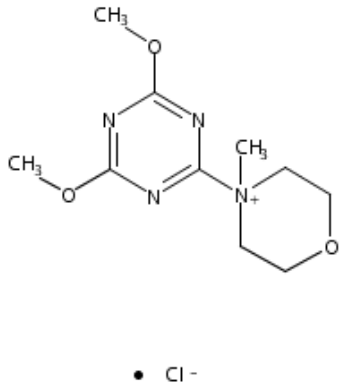
**44. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

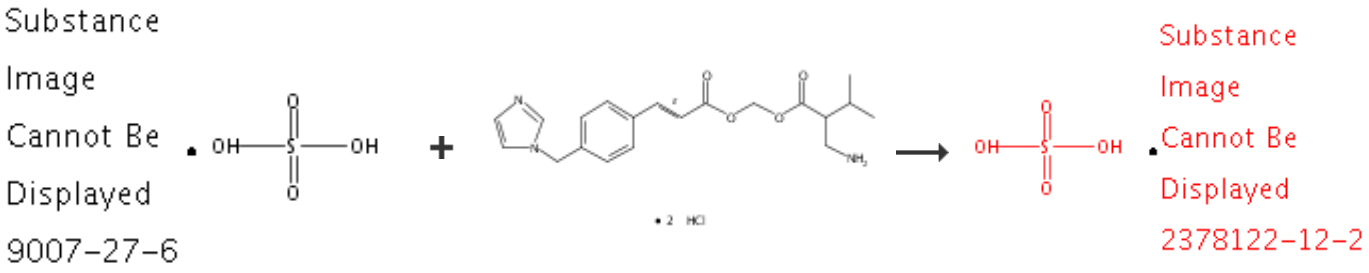
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**45. Single Step**

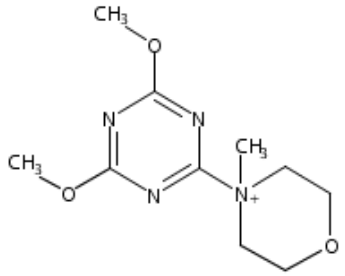



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



**46. Single Step**

Substance

Image

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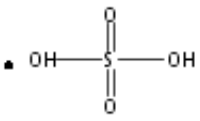

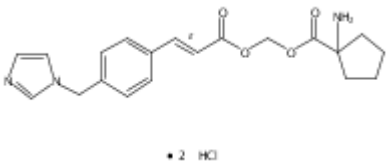

Substance

Image

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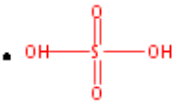
2378121-88-9

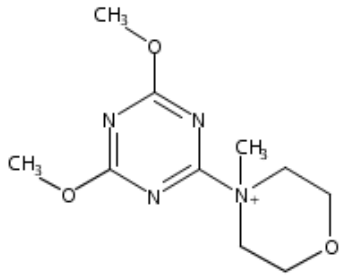


Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

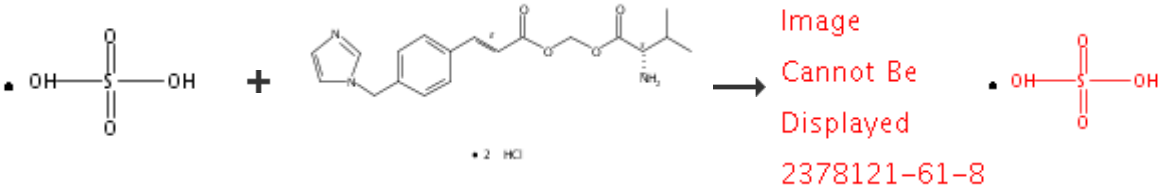
S:$H_2O$, S:EtOH, overnight, rt



**47. Single Step**

Substance Image Cannot Be Displayed

9007-27-6



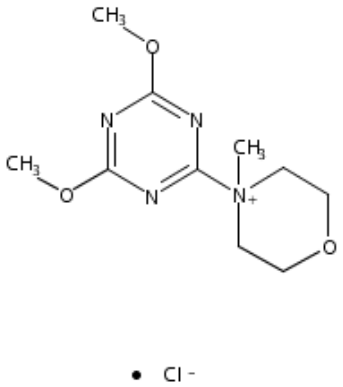
Substance Image Cannot Be Displayed

2378121-61-8

Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

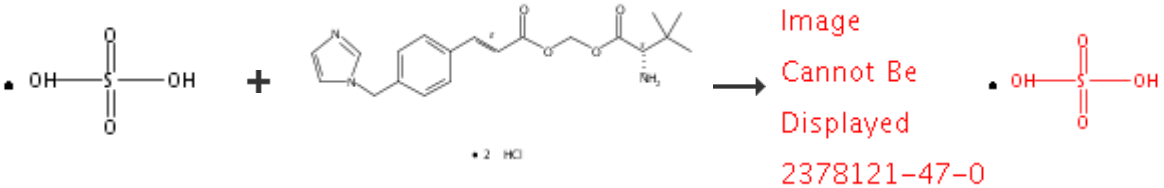
From PCT Int. Appl., 2019189876, 03 Oct 2019



**48. Single Step**

Substance Image Cannot Be Displayed

9007-27-6



Substance Image Cannot Be Displayed

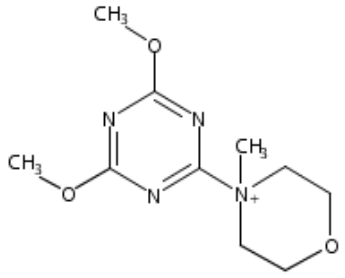
2378121-47-0

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

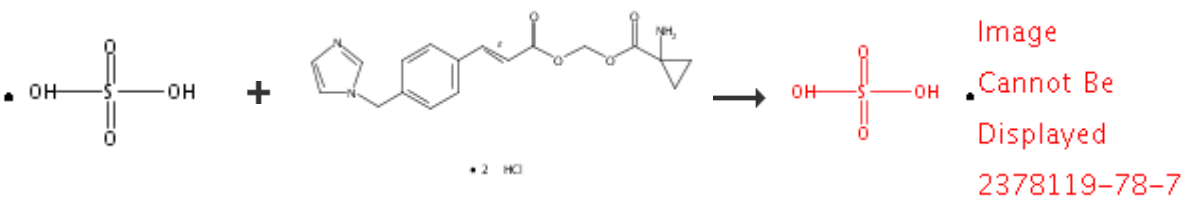
From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt



**49. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



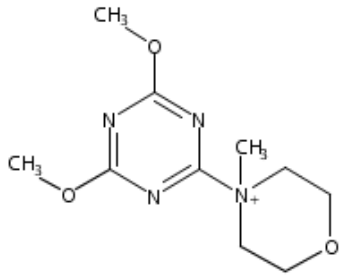
Substance Image Cannot Be Displayed 2378119-78-7

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

S:$H_2O$, S:EtOH, overnight, rt

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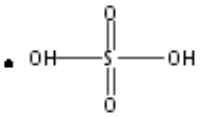
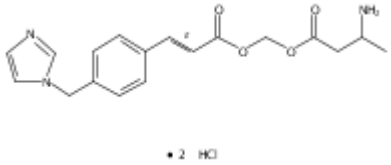
**50. Single Step**

Substance Image Cannot Be Displayed 9007-27-6





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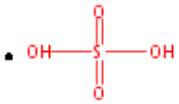
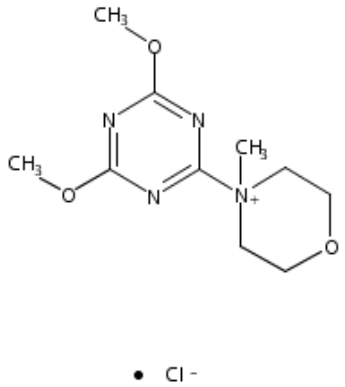


Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

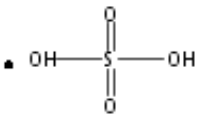
By Kobayashi, Nobuo et al

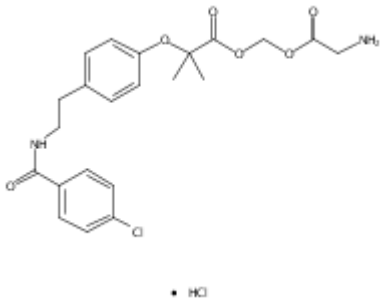
From PCT Int. Appl., 2019189876, 03 Oct 2019



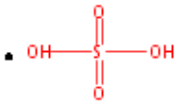
**51. Single Step**

Substance Image Cannot Be Displayed 9007-27-6





Substance Image Cannot Be Displayed 2378118-73-9

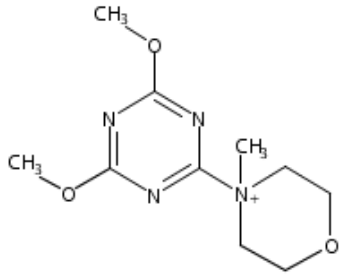


Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

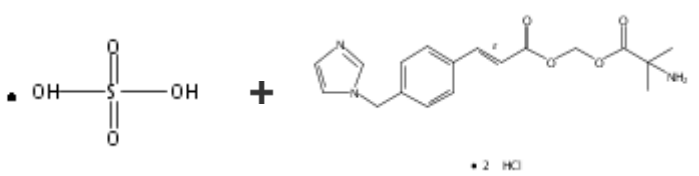
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**52. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



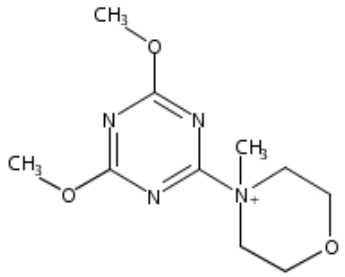
Substance Image Cannot Be Displayed 2378116-04-0

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019

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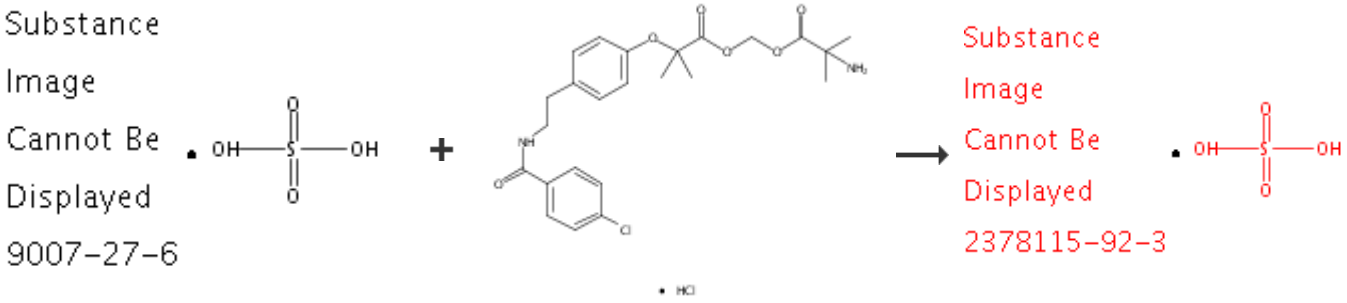
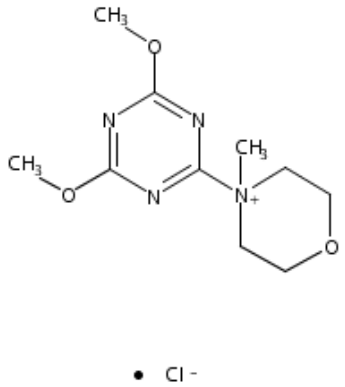
**53. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

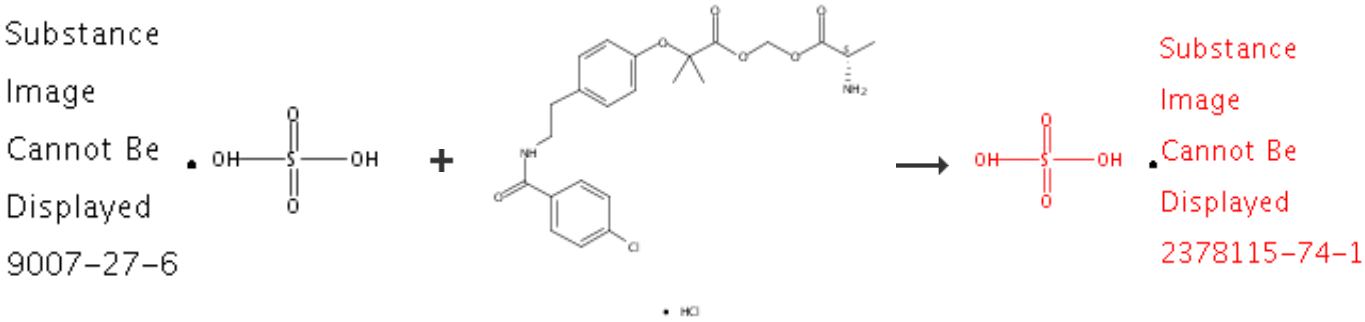
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**54. Single Step**

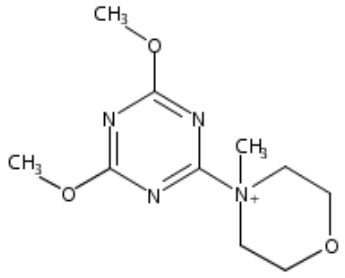



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

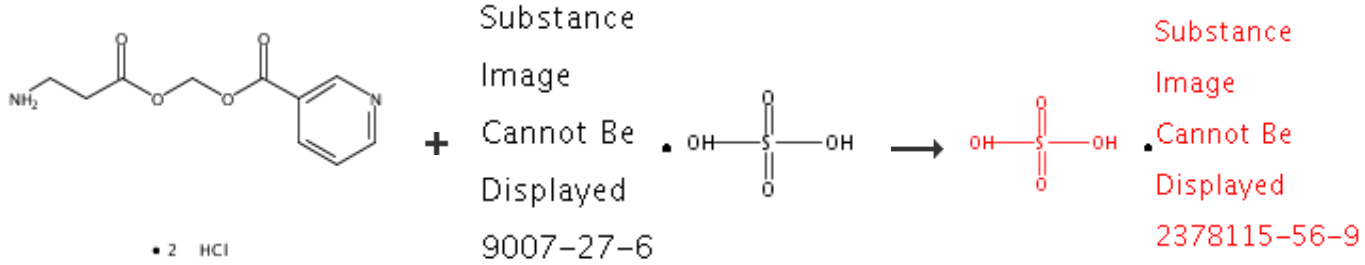
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



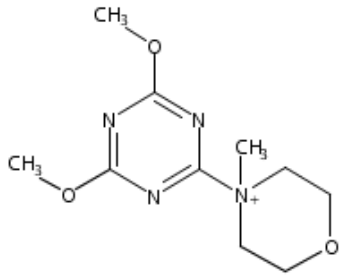
**55. Single Step**




Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

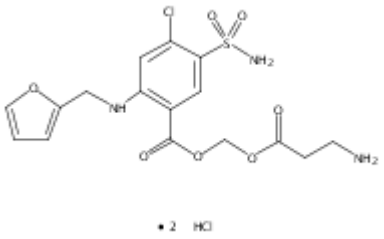
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

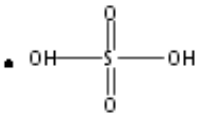
By Kobayashi, Nobuo et al

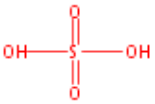
From PCT Int. Appl., 2019189876, 03 Oct 2019



**56. Single Step**



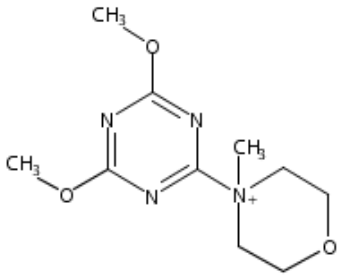
+ Substance Image Cannot Be Displayed 9007-27-6 • 

→ Substance Image Cannot Be Displayed 2378115-32-1 • 

Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

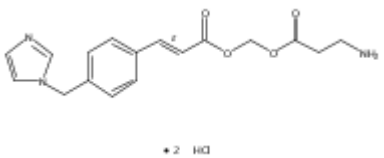
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

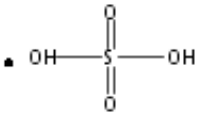
By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**57. Single Step**



+ Substance Image Cannot Be Displayed 9007-27-6 • 

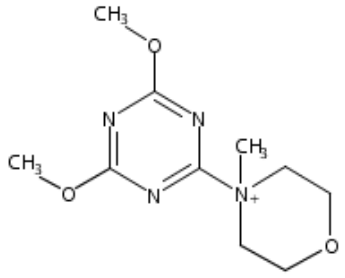
→  • Substance Image Cannot Be Displayed 2378114-93-1

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

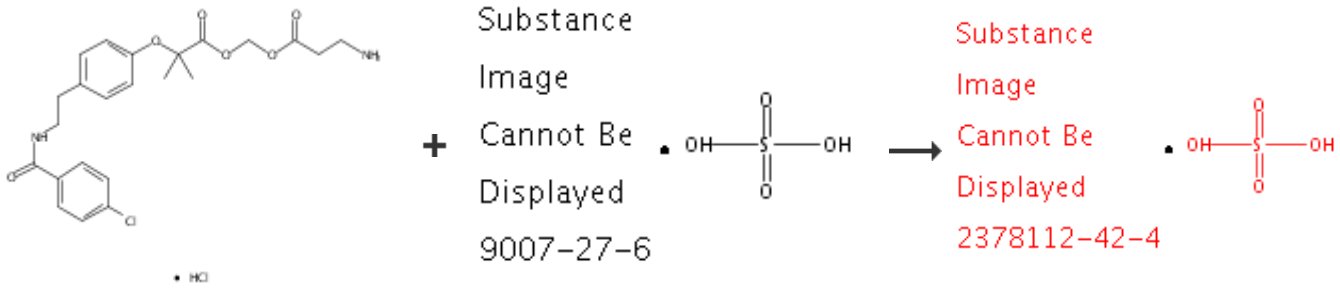
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



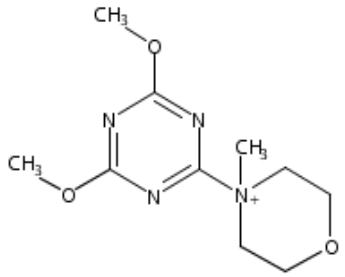
**58. Single Step**




Overview

**Steps/Stages**

1.1 R:



• Cl -

S:$H_2O$, S:EtOH, overnight, rt

**Notes**

alternate stoichiometry of reactant, reagent and solvent may be used, Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

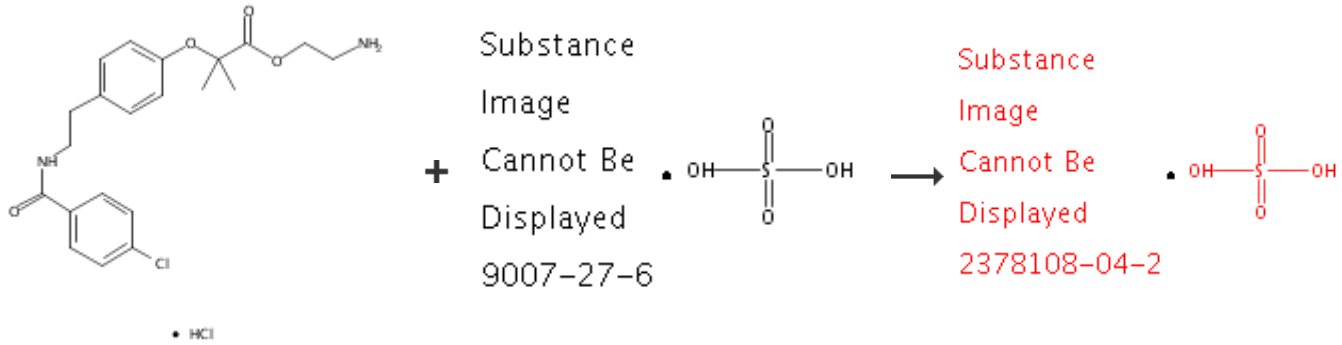
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



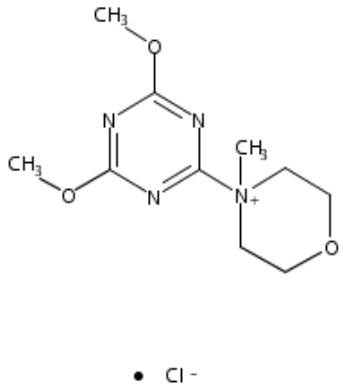
**59. Single Step**




Overview

**Steps/Stages**

1.1 R:





S:$H_2O$, S:EtOH, overnight, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

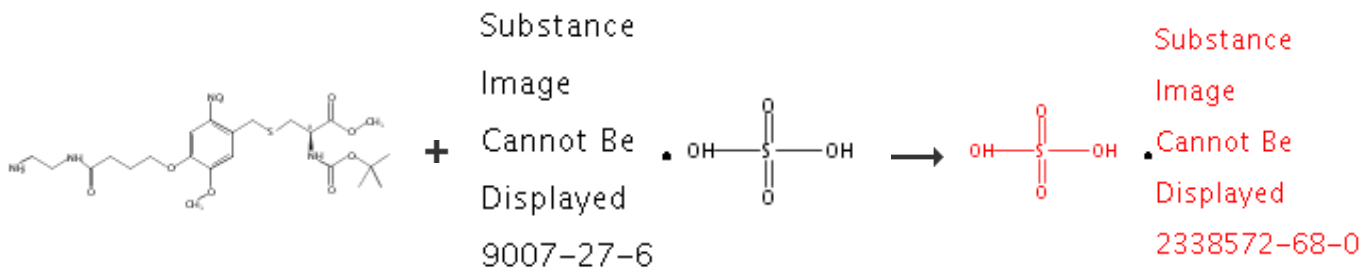
(Carboxylic acid-type compound)-polymer conjugate having biological activity, and method for producing same

By Kobayashi, Nobuo et al

From PCT Int. Appl., 2019189876, 03 Oct 2019



**60. Single Step**

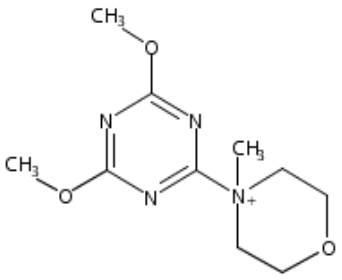



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

2-(N-morpholine)ethanesulfonic acid buffered solution used, Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Preparation, raw materials, product, and application of photocoupled synergistic crosslinked hydrogel material

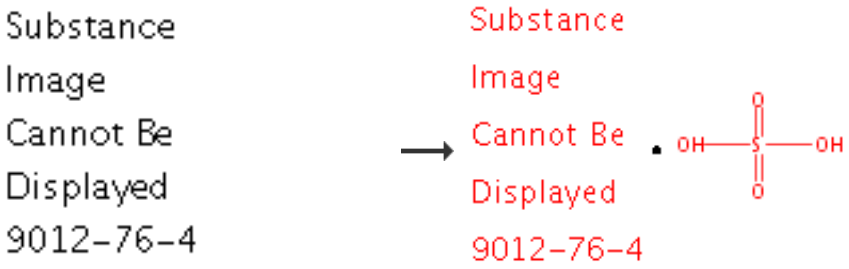
By Zhu, Linyong et al

From Faming Zhuanli Shenqing, 109776450, 21 May 2019

S:$H_2O$, S:DMSO, 24 h, 35°C, pH 5.2



**61. Single Step**




Overview

**Steps/Stages**

1.1 R:$SO_3$, R:O=C($NH_2$)$_2$, 4 h, 90°C, 0.5 MPa
1.2 20 min, 90°C

**Notes**

alternate reaction conditions may be used, fatty alcohol polyoxyethylene ether used in stage 1, low pressure in stage 1, autoclave used in stage 2, Reactants: 1, Reagents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Production of fatty alcohol polyoxyethylene ether sodium sulfate

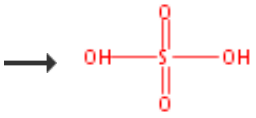
By Huang, Yubin

From Faming Zhuanli Shenqing, 109400865, 01 Mar 2019



**62. Single Step**

Substance Image Cannot Be Displayed 9014-63-5



Substance Image Cannot Be Displayed 9014-63-5

Overview

**Steps/Stages**

1.1 R:$SO_3$, C:4-DMAP, C:EtN=C=N$(CH_2)_3NMe_2$ •HCl, S:$AcNMe_2$, rt → 60°C; 4 h, 60°C

1.2 R:$NaHCO_3$, neutralized

**Notes**

optimization study, optimized on monomer ratio, time and temperature, Reactants: 1, Reagents: 2, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Method for preparing xylan sulfate by catalytic system

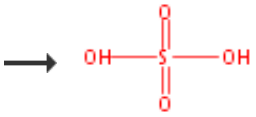
By Li, Jianbin et al

From Faming Zhuanli Shenqing, 110372811, 25 Oct 2019



**63. Single Step**

Substance Image Cannot Be Displayed 9014-63-5



Substance Image Cannot Be Displayed 9014-63-5

Overview

**Steps/Stages**

1.1 R:$SO_3$, C:Py •HCl, S:$AcNMe_2$, 4 h, 60°C

1.2 R:$NaHCO_3$, S:$H_2O$, 60°C, neutralized

**Notes**

Reactants: 1, Reagents: 2, Catalysts: 1, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

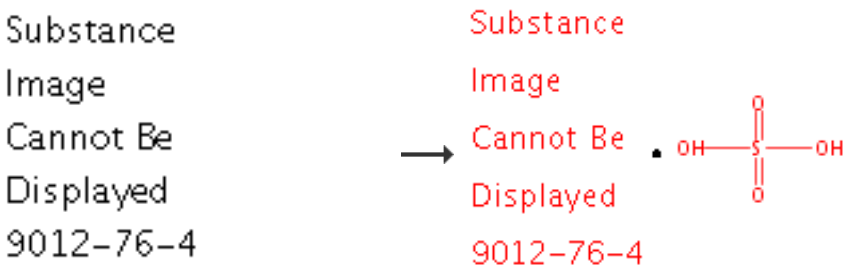
**References**

Method for preparing xylan sulfate

By Li, Jianbin et al

From Faming Zhuanli Shenqing, 110256590, 20 Sep 2019

**64. Single Step**




Overview

**Steps/Stages**

1.1 R:$ClSO_3H$, R:AcOH, S:DMF, 0-4°C; 60 min, rt

1.2 R:NaOH, S:$H_2O$, rt, neutralized

**Notes**

Reactants: 1, Reagents: 3, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

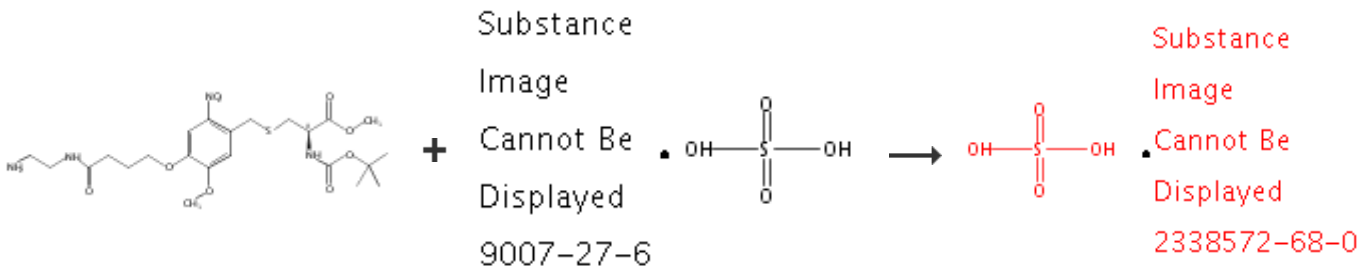
Robust poly(vinyl alcohol) membranes containing chitosan/chitosan derivatives microparticles for pervaporative dehydration of ethanol

By Dudek, Gabriela et al

From Separation and Purification Technology, 234, 116094pp.; 2020



**65. Single Step**

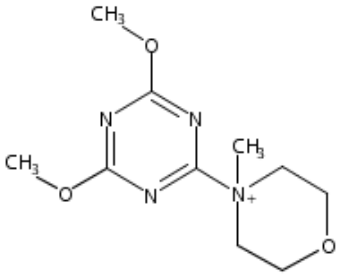



Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

S:$H_2O$, S:DMSO, 24 h, 35°C, pH 5.2

2-(N-morpholine)ethanesulfonic acid buffered solution used, Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Preparation, raw materials, product, and application of photocoupled synergistic crosslinked hydrogel material

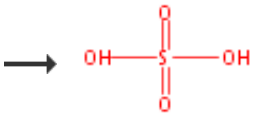
By Zhu, Linyong et al

From PCT Int. Appl., 2019095600, 23 May 2019



**66. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$H_2SO_4$, S:$H_2O$, 150 min

1.2 R:$H_2O$, 4°C

**Notes**

Reactants: 1, Reagents: 2, Solvents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Influence of mechanical pretreatment to isolate cellulose nanocrystals by sulfuric acid hydrolysis

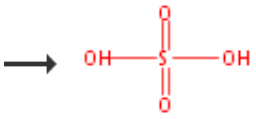
By Pirich, Cleverton Luiz et al

From International Journal of Biological Macromolecules, 130, 622-626; 2019



**67. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$H_2SO_4$, S:$H_2O$, 2 h, 45°C

**Notes**

Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Vehicle paint film based on nanocomposite and preparation method

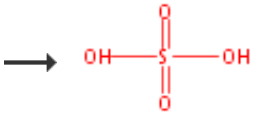
By Wei, Yiyi and Gao, Bixiang

From Faming Zhuanli Shenqing, 110157279, 23 Aug 2019



**68. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$H_2SO_4$, S:$H_2O$

**Notes**

Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Insight into thermal stability of cellulose nanocrystals from new hydrolysis methods with acid blends

By Vanderfleet, Oriana M. et al

From Cellulose (Dordrecht, Netherlands), 26(1), 507-528; 2019

**69. Single Step**

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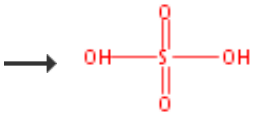

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Overview

**Steps/Stages**

1.1 R:$H_2SO_4$, S:$H_2O$, 4 h, 45°C

**Notes**

Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

High-performance polyurethane nanocomposites based on UPy-modified cellulose nanocrystals

By Tian, Donglin et al

From Carbohydrate Polymers, 219, 191-200; 2019



**70. Single Step**

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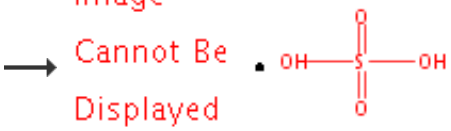

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9004-53-9

Overview

**Steps/Stages**

**Notes**

1.1 R:$H_2SO_4$, R:$H_2NCHO$, S:$ClCH_2CH_2Cl$, < 45°C

1.2 R:$NaHCO_3$, S:$H_2O$, rt, pH 7

Reactants: 1, Reagents: 3, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Starch sulfate slow setting high-efficiency water reducing agent and preparation method thereof

By Yin, Ge

From Faming Zhuanli Shenqing, 109306021, 05 Feb 2019



**71. Single Step**

Substance
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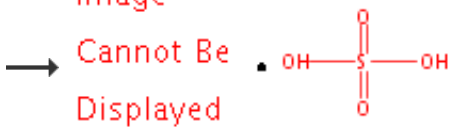
9005-25-8



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9005-25-8 . $HO-S(=O)_2-OH$

Overview

**Steps/Stages**

1.1 R:$H_2SO_4$, R:$H_2NCHO$, S:$ClCH_2CH_2Cl$, < 55°C

1.2 R:NaOH, S:$H_2O$, rt, pH 7

**Notes**

Reactants: 1, Reagents: 3, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Starch sulfate slow setting high-efficiency water reducing agent and preparation method thereof

By Yin, Ge

From Faming Zhuanli Shenqing, 109306021, 05 Feb 2019



**72. Single Step**

Substance
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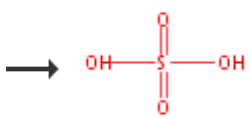
54724-00-4



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$HO-S(=O)_2-OH$ . Cannot Be
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54724-00-4

Overview

**Steps/Stages**

1.1 R:$ClSO_3H$, S:$H_2O$, S:DMF, 50°C; 30 min, 50°C
1.2 C:$H_2SO_4$, 2 h, 50°C

1.3 R:NaOH, S:$H_2O$, neutralized

**Notes**

Reactants: 1, Reagents: 2, Catalysts: 1, Solvents: 2, Steps: 1, Stages: 3, Most stages in any one step: 3

**References**

Method for preparation of curdlan sulfate

By Chen, Meiling et al

From Faming Zhuanli Shenqing, 108752500, 06 Nov 2018



**73. Single Step**

Substance
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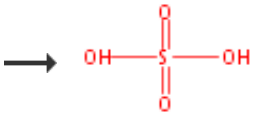
9004-34-6



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9004-34-6

Overview

**Steps/Stages**

1.1 R:$ClSO_3H$, S:$Me(CH_2)_4Me$, 20 min, 0°C; 2 h, rt

**Notes**

Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Nano crystalline cellulose sulfuric acid (s-NCC): a novel green nanocatalyst for the synthesis of polyhydroxy pyrimidine-fused heterocyclic compounds (PPFHs)

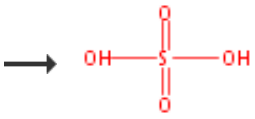
By Nikoofar, Kobra et al

From Cellulose (Dordrecht, Netherlands), 25(10), 5697-5709; 2018



**74. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$SO_3$, S:$ClCH_2CH_2Cl$, 2 h, 25°C

**Notes**

Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Chitosan analog produced via amination of monosulfate of cellulose or hemicellulose

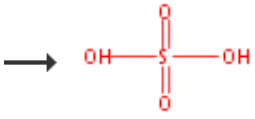
By Yin, Yingwu et al

From Faming Zhuanli Shenqing, 108530546, 14 Sep 2018



**75. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$ClSO_3H$, S:$Me(CH_2)_4Me$, 2 h, 0°C; 2 h, rt

**Notes**

Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

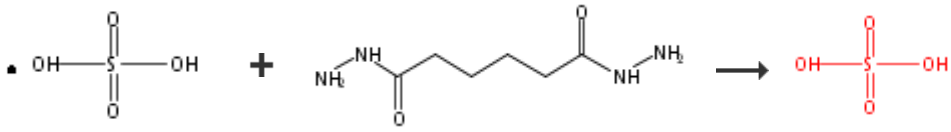
An efficient one-pot neat synthesis of pyrazolo[1,2-b]phthalazines using cellulose sulfuric acid as a biodegradable and recoverable heterogeneous catalyst

By Elmi-Mehr, Maryam et al

From Heterocyclic Letters, 8(4), 773-781; 2018

**76. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



Substance Image Cannot Be Displayed 540474-83-7

Overview

**Steps/Stages**

1.1 R:HCl, S:$H_2O$, pH 6-7

1.2 R:EtN=C=N$(CH_2)_3NMe_2$, R:N-Hydroxysuccinimide, 8 h, rt

1.3 R:NaOH, S:$H_2O$, neutralized

**Notes**

Reactants: 2, Reagents: 4, Solvents: 1, Steps: 1, Stages: 3, Most stages in any one step: 3

**References**

Redox/enzyme sensitive chondroitin sulfate-based self-assembled nanoparticles loading docetaxel for the inhibition of metastasis and growth of melanoma

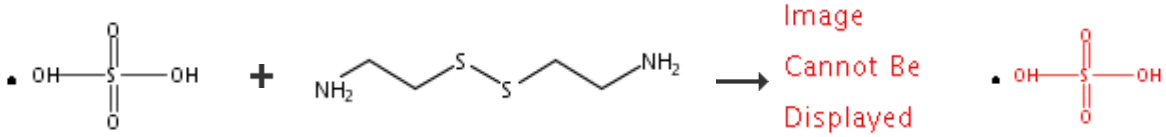
By Liu, Mengrui et al

From Carbohydrate Polymers, 184, 82-93; 2018



**77. Single Step**

Substance Image Cannot Be Displayed 9007-27-6



Substance Image Cannot Be Displayed 2170084-20-3

Overview

**Steps/Stages**

**Notes**

1.1 R:HCl, S:$H_2O$, pH 6-7

1.2 R:EtN=C=N$(CH_2)_3NMe_2$, R:N-Hydroxysuccinimide, 8 h, rt

1.3 R:NaOH, S:$H_2O$, neutralized

Reactants: 2, Reagents: 4, Solvents: 1, Steps: 1, Stages: 3, Most stages in any one step: 3

**References**

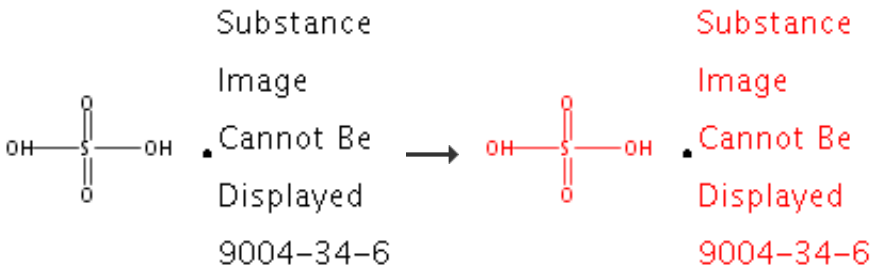
Redox/enzyme sensitive chondroitin sulfate-based self-assembled nanoparticles loading docetaxel for the inhibition of metastasis and growth of melanoma

By Liu, Mengrui et al

From Carbohydrate Polymers, 184, 82-93; 2018



**78. Single Step**




sodium ion-exchanged, copper complexes

Overview

**Steps/Stages**

1.1

**Notes**

no experimental detail, Reactants: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Green biorefinery of larch wood biomass to obtain the bioactive compounds, functional polymers and nanoporous materials

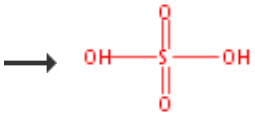
By Kuznetsov, B. N. et al

From Wood Science and Technology, 52(5), 1377-1394; 2018



**79. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$H_2NSO_3H$

**Notes**

Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Green biorefinery of larch wood biomass to obtain the bioactive compounds, functional polymers and nanoporous materials

By Kuznetsov, B. N. et al

From Wood Science and Technology, 52(5), 1377-1394; 2018



**80. Single Step**

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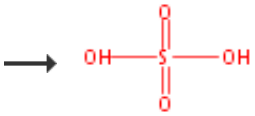

Substance Image Cannot Be Displayed 9036-66-2

Overview

**Steps/Stages**

1.1 R:$H_2NSO_3H$

**Notes**

Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Green biorefinery of larch wood biomass to obtain the bioactive compounds, functional polymers and nanoporous materials

By Kuznetsov, B. N. et al

From Wood Science and Technology, 52(5), 1377-1394; 2018

**81. Single Step**

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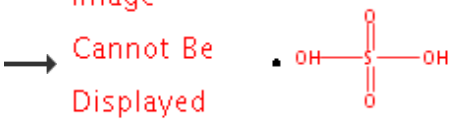

Overview

**Steps/Stages**

1.1 R:$ClSO_3H$, S:DMF, 6 h, 70°C

1.2 R:NaOH, S:$H_2O$, pH 7

**Notes**

Reactants: 1, Reagents: 2, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Method for preparing osthole chitosan derivative micelle useful for osteoporosis

By Guo, Yang et al

From Faming Zhuanli Shenqing, 108102116, 01 Jun 2018



**82. Single Step**

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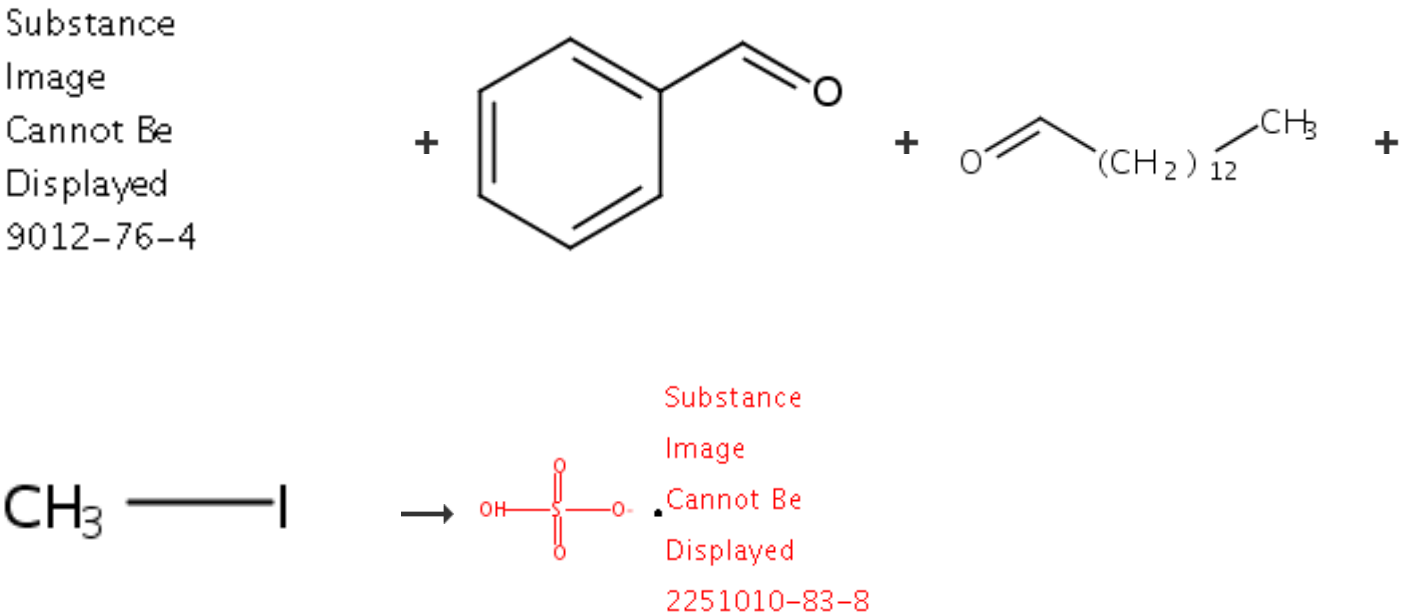


Overview

**Steps/Stages**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, 40°C; 1.5 h, 40°C

1.3 R:AcOH, pH 4.5

1.4 pH 10

1.5 R:NaOH, S:$H_2O$, S:$Me_2CHOH$, 12 h, rt

1.6 R:$ClSO_3H$, 10°C; 10 h, 40°C

**Notes**

in the dark in stage 5, Reactants: 4, Reagents: 5, Solvents: 3, Steps: 1, Stages: 6, Most stages in any one step: 6

**References**

Chitosan amphoteric ion bactericide and preparation method and application thereof

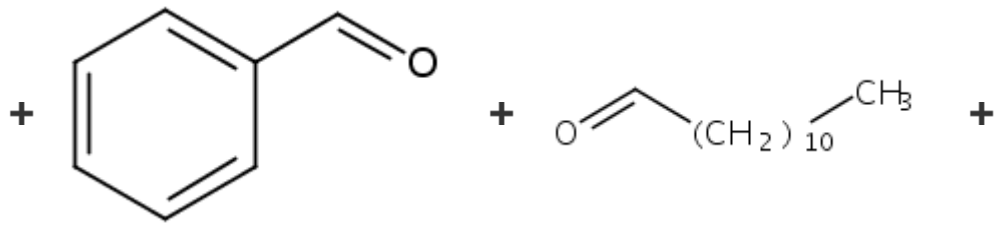
By Qu, Huimin et al

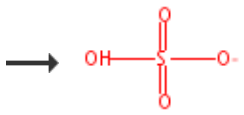
From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018



**83. Single Step**

Substance Image Cannot Be Displayed 9012-76-4





Substance Image Cannot Be Displayed 2251010-77-0

Overview

**Steps/Stages**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, 40°C; 1 h, 40°C

1.3 R:AcOH, pH 4.5

1.4 pH 11

1.5 R:NaOH, S:$H_2O$, S:$Me_2CHOH$, 12 h, rt

1.6 R:$ClSO_3H$, 4°C; 10 h, 40°C

**Notes**

in the dark in stage 5, Reactants: 4, Reagents: 5, Solvents: 3, Steps: 1, Stages: 6, Most stages in any one step: 6

**References**

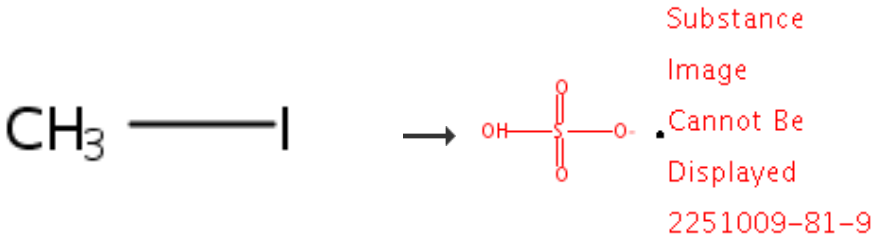
Chitosan amphoteric ion bactericide and preparation method and application thereof

By Qu, Huimin et al

From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018

**84. Single Step**

Substance Image Cannot Be Displayed 9012-76-4



Substance Image Cannot Be Displayed 2251009-81-9

Overview

**Steps/Stages**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, 40°C; 2 h, 40°C

1.3 R:AcOH, pH 4.5

1.4 10 h, 40°C, pH 10.5

1.5 R:NaOH, S:$H_2O$, S:$Me_2CHOH$, 12 h, rt

1.6 R:$ClSO_3H$, 4°C; 10 h, 40°C

**Notes**

in the dark in stage 5, Reactants: 4, Reagents: 5, Solvents: 3, Steps: 1, Stages: 6, Most stages in any one step: 6

**References**

Chitosan amphoteric ion bactericide and preparation method and application thereof

By Qu, Huimin et al

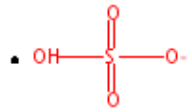
From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018



**85. Single Step**

Substance Image Cannot Be Displayed 9012-76-4

Substance Image Cannot Be Displayed



2251009-59-1

Overview

**Steps/Stages**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, S:$H_2O$, 40°C; 1.5 h, 40°C, pH 4.5

1.3 R:NaOH, S:$H_2O$, pH 10

1.4 R:NaOH, S:$Me_2CHOH$, 8 h, rt

1.5 R:$ClSO_3H$, 5°C; 10 h, 40°C

**Notes**

in the dark in stage 4, Reactants: 3, Reagents: 4, Solvents: 3, Steps: 1, Stages: 5, Most stages in any one step: 5

**References**

Chitosan amphoteric ion bactericide and preparation method and application thereof

By Qu, Huimin et al

From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018

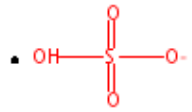


**86. Single Step**

Substance Image Cannot Be Displayed

9012-76-4

Substance Image Cannot Be Displayed



2251009-47-7

Overview

**Steps/Stages**

**Notes**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, S:$H_2O$, 40°C; 1 h, 40°C

1.3 R:NaOH, S:$H_2O$, pH 10

1.4 R:NaOH, S:$Me_2CHOH$, 10 h, rt

1.5 R:$ClSO_3H$, 10°C; 10 h, 40°C

in the dark in stage 4, Reactants: 3, Reagents: 4, Solvents: 3, Steps: 1, Stages: 5, Most stages in any one step: 5

**References**

Chitosan amphoteric ion bactericide and preparation method and application thereof

By Qu, Huimin et al

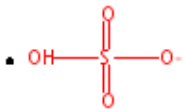
From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018



**87. Single Step**

Substance Image Cannot Be Displayed 9012-76-4

Substance Image Cannot Be Displayed 2251009-46-6



Overview

**Steps/Stages**

**Notes**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, S:$H_2O$, 40°C; 2 h, 40°C

1.3 R:NaOH, S:$H_2O$, pH 11

1.4 R:NaOH, S:$Me_2CHOH$, 14 h, rt

1.5 R:$ClSO_3H$, 0°C; 10 h, 40°C

in the dark in stage 4, Reactants: 3, Reagents: 4, Solvents: 3, Steps: 1, Stages: 5, Most stages in any one step: 5

**References**

Chitosan amphoteric ion bactericide and preparation method and application thereof

By Qu, Huimin et al

From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018



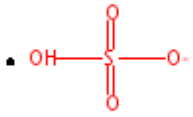
**88. Single Step**

Substance Image Cannot Be Displayed

9012-76-4

Substance Image Cannot Be Displayed

332077-30-2



Overview

**Steps/Stages**

1.1 R:$C_{16}H_{33}N^{+}Me_3$ •$Cl^{-}$, S:AcOH, 10 h, 40°C, pH 4.5

1.2 R:$NaBH_4$, S:$H_2O$, 40°C; 1 h, 40°C

1.3 R:NaOH, S:$H_2O$, pH 10

1.4 R:NaOH, S:$Me_2CHOH$, 12 h, rt

1.5 R:$ClSO_3H$, 5°C; 10 h, 40°C

**Notes**

in the dark in stage 4, Reactants: 3, Reagents: 4, Solvents: 3, Steps: 1, Stages: 5, Most stages in any one step: 5

**References**

Chitosan amphoteric ion bactericide and preparation method and application thereof

By Qu, Huimin et al

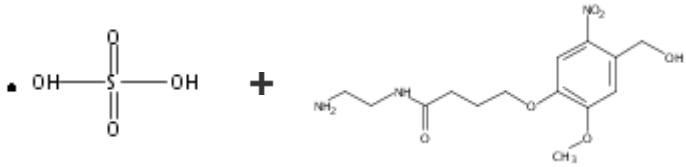
From Faming Zhuanli Shenqing, 108651462, 16 Oct 2018



**89. Single Step**

Substance Image Cannot Be Displayed

9007-27-6



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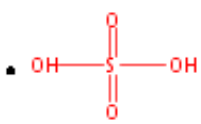
9007-27-6



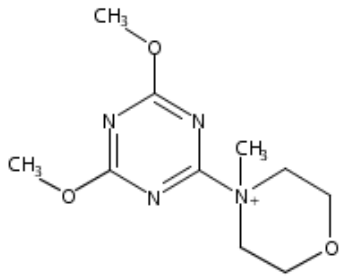
reaction products with

Overview

**Steps/Stages**

**Notes**

1.1 R:



• Cl -

MES buffered solution used, Reactants: 2, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Preparation method of light-induced nitroso crosslinking hydrogel material, its preparation method and application

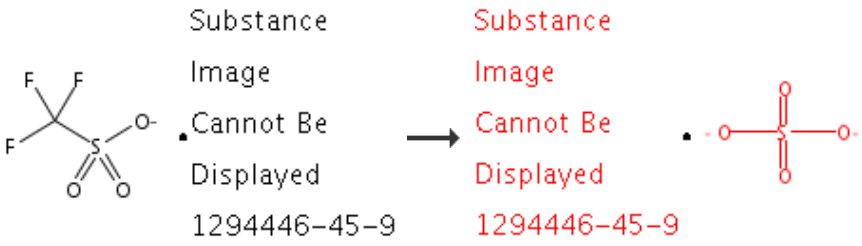
By Lin, Qiuning et al

From Faming Zhuanli Shenqing, 107987287, 04 May 2018

S:$H_2O$, S:DMSO, 24 h, 35°C, pH 5.2



**90. Single Step**




Overview

**Steps/Stages**

1.1 R:$(Bu_4N^+)_2 \cdot SO_4$

$^{2+}$, S:$H_2O$, S:MeCN, neutralized

**Notes**

Reactants: 1, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Anion Exchange Drives Reversible Phase Transfer of Coordination Cages and Their Cargoes

By Grommet, Angela B. et al

From Journal of the American Chemical Society, 140(44), 14770-14776; 2018

Reaction Protocol

**Procedure**

1. Dissolve the ligand in $CH_3CN$ (1.5 mL) and add tetrabutylammonium sulfate ($(nBu_4N)_2SO_4$) solution 50 wt% in water (1.5 equivalents relative to cage).
2. Centrifuge the mixture.

View more...

**Available Experimental Data**

$^1$H NMR, $^{13}$C NMR, State

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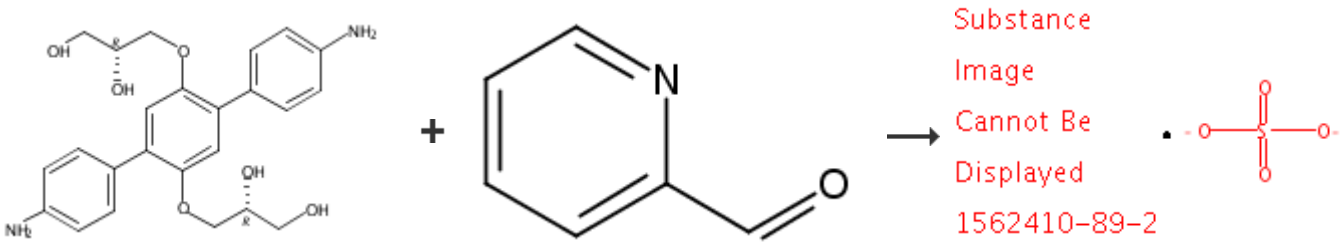
**91. Single Step**




Overview

**Steps/Stages**

1.1 R:$FeSO_4 \cdot 7H_2O$, S:$D_2O$, 12 h, rt

**Notes**

Reactants: 2, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Anion Exchange Drives Reversible Phase Transfer of Coordination Cages and Their Cargoes

By Grommet, Angela B. et al

From Journal of the American Chemical Society, 140(44), 14770-14776; 2018

Reaction Protocol

**Procedure**

1. Combine the ligand (13.2 mg, 3.00 x 10-2 mmol), 2-formylpyridine (6.43 µL, 6.00 x 10-2 mmol), and iron (II) sulfate heptahydrate (5.56 mg, 2.00 x 10-2 mmol) with $D_2O$ (5 mL) in a glove box.
2. Stir the resulting purple solution for 12 hours to obtain product.

View more...

**Available Experimental Data**

$^1H$ NMR, $^{13}C$ NMR

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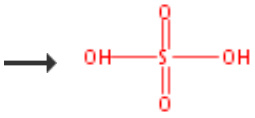
**92. Single Step**

Substance Image Cannot Be Displayed 9004-34-6



Substance Image Cannot Be Displayed 9004-34-6

Overview

**Steps/Stages**

1.1 R:$ClSO_3H$, S:Dioxane, rt; 3 h, 20°C

1.2 R:NaOH, S:$H_2O$, S:EtOH, neutralized

**Notes**

optimization study in stage 1, optimized on temperature in stage 1, Reactants: 1, Reagents: 2, Solvents: 3, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Optimized methods for obtaining cellulose and cellulose sulfates from birch wood

By Kuznetsov, Boris N. et al

From Wood Science and Technology, 49(4), 825-843; 2015

Reaction Protocol

**Procedure**

1. Carry out the sulfation of cellulose by its treatment with chlorosulfonic acid (five equivalents) in dioxane.
2. Suspend dried cellulose (1.0 g, 6.17 mmol) in anhydrous 1,4-dioxane (30 ml).

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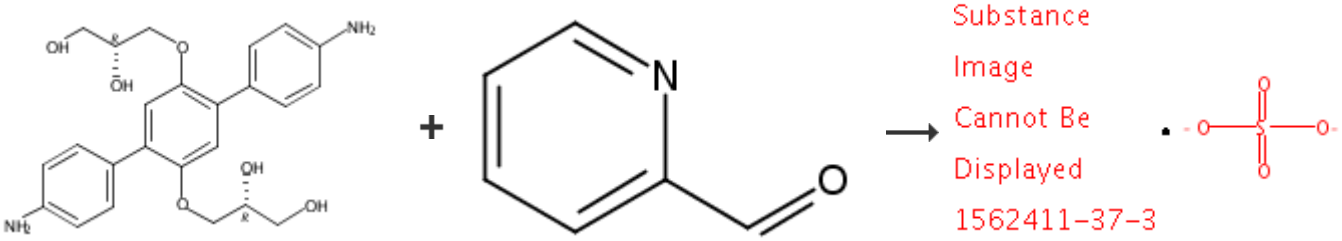
**93. Single Step**



Substance Image Cannot Be Displayed 1562411-37-3

Overview

**Steps/Stages**

**Notes**

1.1 R:$FeSO_4$, S:$D_2O$, 12 h, rt

glovebox, Reactants: 2, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Enantiopure Water-Soluble [Fe4L6] Cages: Host-Guest Chemistry and Catalytic Activity

By Bolliger, Jeanne L. et al

From Angewandte Chemie, International Edition, 52(31), 7958-7962; 2013

Reaction Protocol

**Procedure**

1. In a glove box, place FeSO 4 * 7 $H_2O$ (10.0 mg, 0.0360 mmol, 4 equivalent) and (2R,2'R)-3,3'-((4,4''-diamino-[1,1':4',1''-terphenyl]-2',5'-diyl)bis(oxy))bis(propane-1,2-diol)(0.0540 mmol) in a 20 ml vial.
2. Add 10.0 ml degassed $D_2O$.

View more...

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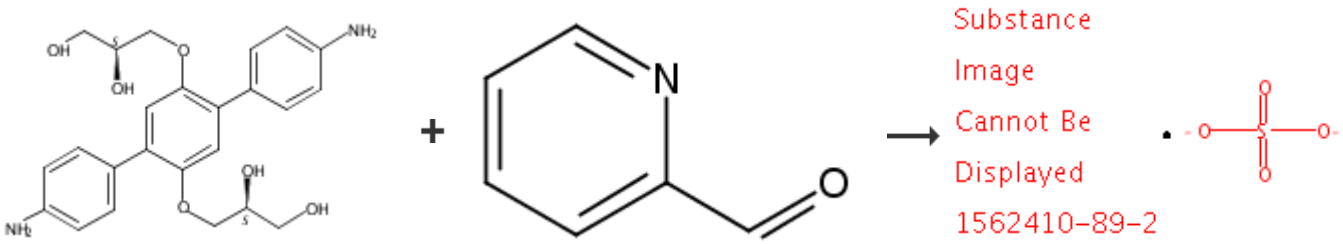
**94. Single Step**




Overview

**Steps/Stages**

1.1 R:$FeSO_4$, S:$D_2O$, 12 h, rt

**Notes**

glovebox, Reactants: 2, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Enantiopure Water-Soluble [Fe4L6] Cages: Host-Guest Chemistry and Catalytic Activity

By Bolliger, Jeanne L. et al

From Angewandte Chemie, International Edition, 52(31), 7958-7962; 2013

Reaction Protocol

**Procedure**

1. In a glove box, place FeSO 4 *7 $H_2O$ (10.0 mg, 0.0360 mmol, 4 equivalent) and ((2R,2'R)-3,3'-((4,4''-diamino-[1,1':4',1''-terphenyl]-2',5'-diyl)bis(oxy))bis(propane-1,2-diol) (0.0540 mmol) in a 20 ml vial.
2. Add 10.0 ml degassed $D_2O$.

View more...

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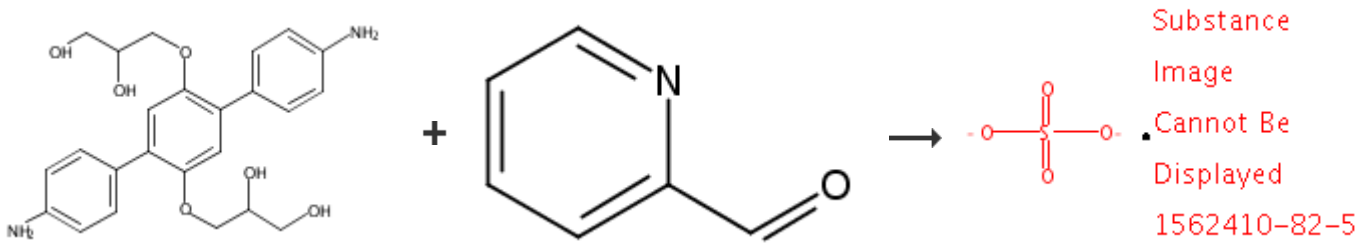
**95. Single Step**




Overview

**Steps/Stages**

1.1 R:$FeSO_4$, S:$D_2O$, 12 h, rt

**Notes**

glovebox, Reactants: 2, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

Enantiopure Water-Soluble [Fe4L6] Cages: Host-Guest Chemistry and Catalytic Activity

By Bolliger, Jeanne L. et al

From Angewandte Chemie, International Edition, 52(31), 7958-7962; 2013

Reaction Protocol

**Procedure** 1. In a glove box, place FeSO 4 *7 $H_2O$ (10.0 mg, 0.0360 mmol, 4 equivalent) and (2S,2'S)-3,3'-((4,4''-diamino-[1,1':4',1''-terphenyl]-2',5'-diyl)bis(oxy))bis(propane-1,2-diol) (0.0540 mmol) in a 20 ml vial.
2. Add 10.0 ml degassed $D_2O$.

View more...

**Available Experimental Data** $^1H$ NMR, $^{13}C$ NMR

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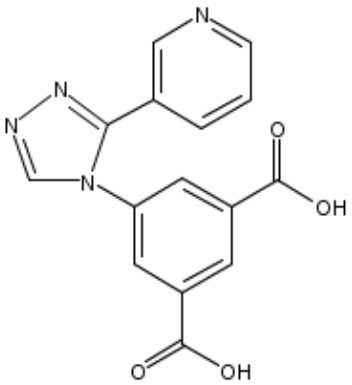
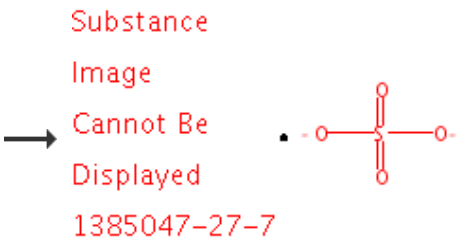
**96. Single Step**






Overview

**Steps/Stages**

1.1 R:$CuSO_4$, S:$H_2O$, S:MeCN, 16 h, reflux

**Notes**

alternative reaction conditions gave lower yield, Reactants: 1, Reagents: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

An Isomorphous Series of Cubic, Copper-Based Triazolyl Isophthalate MOFs: Linker Substitution and Adsorption Properties

By Lincke, Joerg et al

From Inorganic Chemistry, 51(14), 7579-7586; 2012

Experimental Procedure

**Method III: Reflux synthesis** Respective amounts of ligand and metal salt were suspended in the given solvent and heated under reflux for 1.5 h-72 h. Afterwards, the reaction was cooled to room temperature, filtered off and washed with the same solvent as used for the synthesis. Afterwards, the obtained microcrystalline product was dried in air. Compound (**9**), green, microcrystalline powder, yield (3.28g).

Reaction Protocol

**Procedure**

1. Suspend ligand and metal salt in the MeCN solvent.
2. Heat the mixture under reflux for 1.5 h-72 hours.

View more...

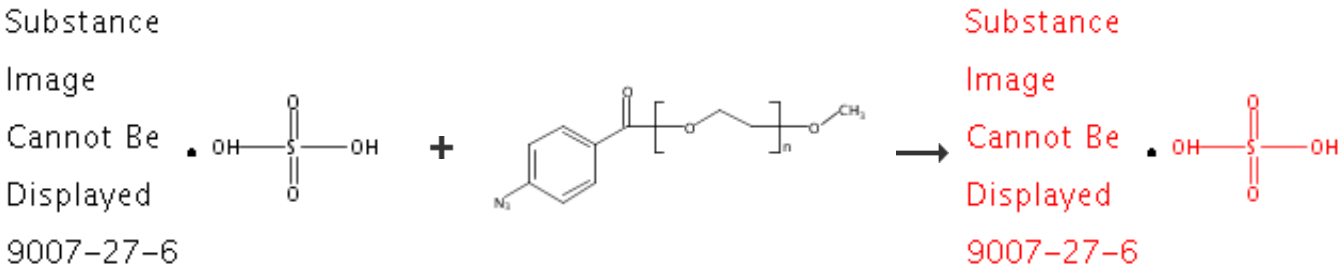
**Available Experimental Data**

State

View with MethodsNow



**97. Single Step**




β-1→4-(2-propenyl-β-*D*-xylo-pyranoside)-ter

((benzoic acid-4-yl)1,2,3-triazin-4-yl)met

**54%**

Overview

**Steps/Stages**

1.1 R:EtN(Pr-*i*)$_2$, R:CuSO$_4$, S:DMSO, 12 h, 37°C

**Notes**

solid-supported reaction, Reactants: 2, Reagents: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

**References**

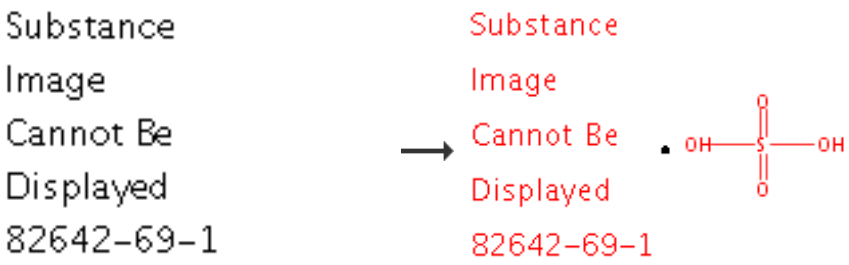
Efficient and widely applicable method of constructing neo-proteoglycan utilizing copper(I) catalyzed 1,3-dipolar cycloaddition

By Yamaguchi, Masanori et al

From Tetrahedron Letters, 47(42), 7455-7458; 2006



**98. Single Step**




Overview

**Steps/Stages**

**Notes**

1.1 R:Py-$SO_3$ (1:1), S:$C_5H_5N$, 16 h, rt

1.2 R:$Bu_3N$, S:$H_2O$, pH 6

prophetic reaction, Reactants: 1, Reagents: 2, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Preparation of anionic conjugates of glycosylated bacterial metabolite

By Kett, Warren Charles and Chen, Yugang

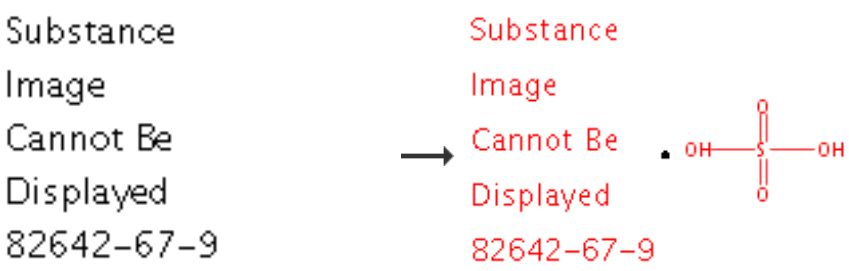
From PCT Int. Appl., 2010037179, 08 Apr 2010

Experimental Procedure

Example 3.Sulfation of Fmoc-Derivatives. Glycosylated metabolite (1 mmol) is dissolved in DMF (20 mL), Py.$SO_3$ (3-fold molar excess over hydroxyl and amine groups) is added and the mixture stirred at 50°C. for 16 h. The reaction is quenched by addition of water (80 mL) and adjusted to pH 6 by addition of tributylamine. The sulfated product is extracted using preparative reverse-phase ion-pairing HPLC Example 3.Sulfation of Fmoc-Derivatives.



**99. Single Step**




Overview

**Steps/Stages**

1.1 R:Py-$SO_3$ (1:1), S:$C_5H_5N$, 16 h, rt

1.2 R:$Bu_3N$, S:$H_2O$, pH 6

**Notes**

prophetic reaction, Reactants: 1, Reagents: 2, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Preparation of anionic conjugates of glycosylated bacterial metabolite

By Kett, Warren Charles and Chen, Yugang

From PCT Int. Appl., 2010037179, 08 Apr 2010

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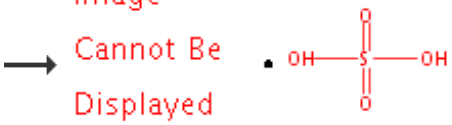
Example 3.Sulfation of Fmoc-Derivatives. Glycosylated metabolite (1 mmol) is dissolved in DMF (20 mL), Py.$SO_3$ (3-fold molar excess over hydroxyl and amine groups) is added and the mixture stirred at 50°C. for 16 h. The reaction is quenched by addition of water (80 mL) and adjusted to pH 6 by addition of tributylamine. The sulfated product is extracted using preparative reverse-phase ion-pairing HPLC Example 3.Sulfation of Fmoc-Derivatives.



**100. Single Step**

Substance Image Cannot Be Displayed 82642-66-8



Substance Image Cannot Be Displayed 82642-66-8

Overview

**Steps/Stages**

1.1 R:Py-$SO_3$ (1:1), S:$C_5H_5N$, 16 h, rt

1.2 R:$Bu_3N$, S:$H_2O$, pH 6

**Notes**

prophetic reaction, Reactants: 1, Reagents: 2, Solvents: 2, Steps: 1, Stages: 2, Most stages in any one step: 2

**References**

Preparation of anionic conjugates of glycosylated bacterial metabolite

By Kett, Warren Charles and Chen, Yugang

From PCT Int. Appl., 2010037179, 08 Apr 2010

Experimental Procedure

Example 3.Sulfation of Fmoc-Derivatives. Glycosylated metabolite (1 mmol) is dissolved in DMF (20 mL), Py.$SO_3$ (3-fold molar excess over hydroxyl and amine groups) is added and the mixture stirred at 50°C. for 16 h. The reaction is quenched by addition of water (80 mL) and adjusted to pH 6 by addition of tributylamine. The sulfated product is extracted using preparative reverse-phase ion-pairing HPLC Example 3.Sulfation of Fmoc-Derivatives.