Volume 149, May 2013

ISSN 0022-1139

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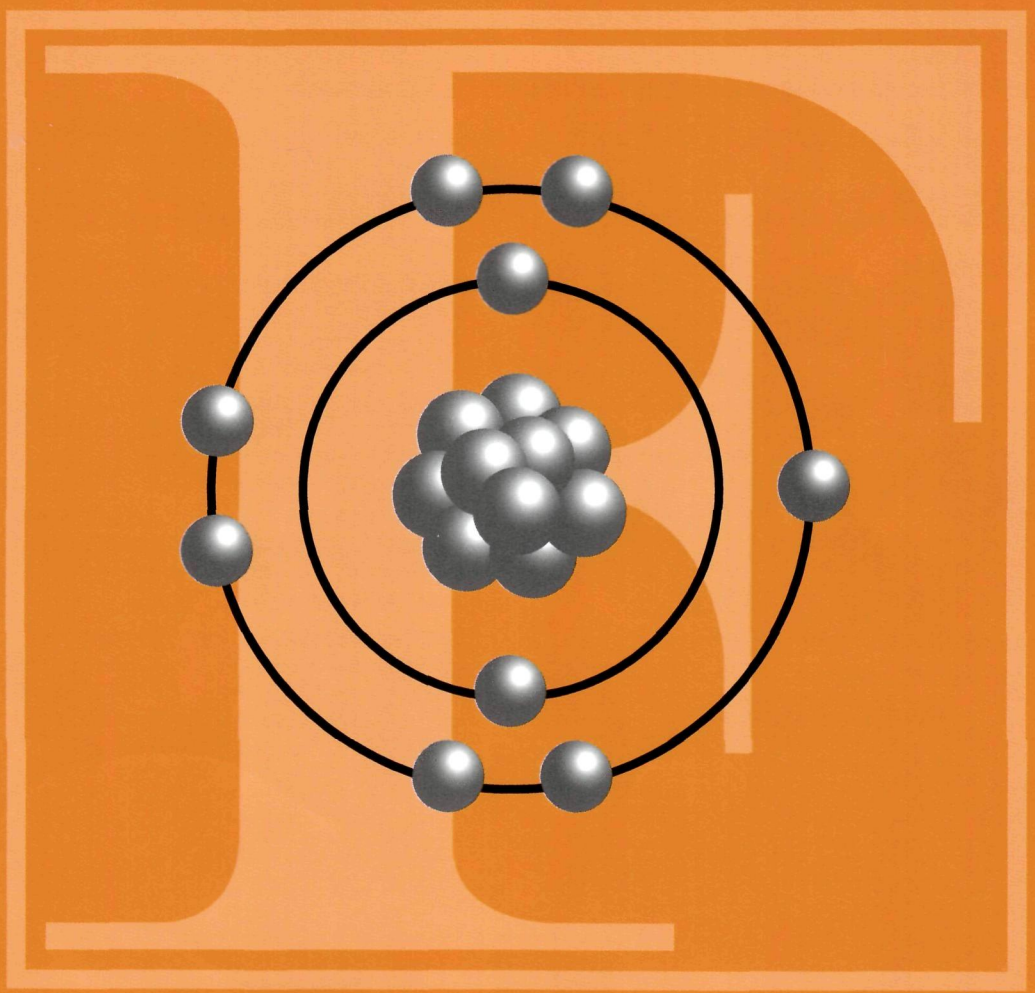
JOURNAL OF FLUORINE CHEMISTRY



J. Fluorine Chem.

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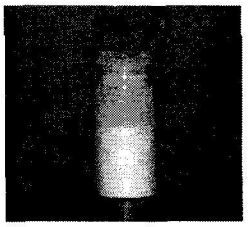
Fluorine compounds as energy conversion materials

Tsuyoshi Nakajima

Department of Applied Chemistry, Aichi Institute of Technology, Yakusa, Toyota 470-0392, Japan

► Graphite fluoride is an excellent cathode material of primary Li battery. ► Fluorine–graphite intercalation compound acts as new electrode of F_2 production. ► Surface modification by fluorine is effective to improve electrode characteristics. ► Organo-fluorine compounds are new solvents for Li ion battery.



Graphite fluoride

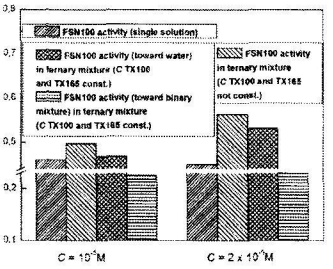
J. Fluorine Chem., 149 (2013) 1

Properties of the ternary mixtures of fluorocarbon and hydrocarbon nonionic surfactants at the water–air interface

Katarzyna Szymczyk

Department of Interfacial Phenomena, Faculty of Chemistry, Maria Curie-Skłodowska University, Maria Curie-Skłodowska Sq. 3, 20-031 Lublin, Poland

► The area occupied by the FSN100 molecule in the mixed monolayer at the water–air interface is higher than that of single solution. ► The presence of FSN100 decreases the adsorption of TX100 and TX165 at the water–air interface. ► There is a synergetic effect in the reduction of water surface tension by the mixture of TX100, TX165 and FSN100.



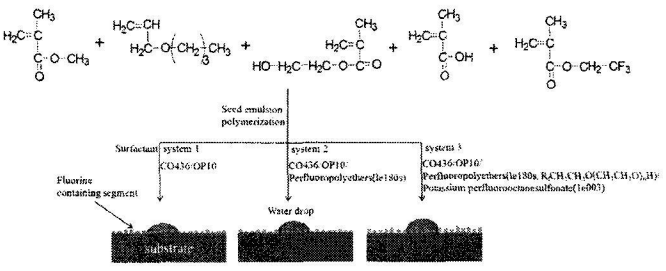
J. Fluorine Chem., 149 (2013) 8

Synthesis and characterization of the fluorinated acrylic latex: Effect of fluorine-containing surfactant on properties of the latex film

Wei Yang[ab], Yichi Chen[b], Dongxiao Han[a], Liqun Zhu[a]

[a]*School of Material Science & Engineering, Beihang University, Beijing 100191, China*

[b]*Key Laboratory of Bio-Inspired Smart Interfacial Science and Technology of Ministry of Education, School of Chemistry & Environment, Beihang University, Beijing 100191, China*



► Different types of surfactants are used to synthesize fluorinated acrylate latex. ► Fluorine containing surfactant leads to an increase in latex stability. ► Conversion of fluorinated monomer is increased after addition of fluoro surfactant. ► Surface roughness increases as the addition of fluorine containing surfactant.

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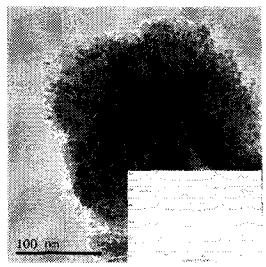
Nano-crystals of various lanthanide fluorides prepared using the ionic liquid bmimPF$_6$

Vilém Bartůněk[a], Jakub Rak[b], Zdeněk Sofer[a], Vladimír Král[b]

[a]*Department of Inorganic Chemistry, Faculty of Chemical Technology, Institute of Chemical Technology, Technická 5, 166 28 Prague 6, Czech Republic*

[b]*Department of Analytical Chemistry, Faculty of Chemical Engineering, Institute of Chemical Technology, Technická 5, 166 28 Prague 6, Czech Republic*



► Nano fluorides of nearly all of the lanthanides were prepared via a one-pot reaction using the ionic liquid bmimPF$_6$. ► Phase compositions of the samples are hexagonal, orthorhombic or a mixture of these. ► Fluorescence measurements were performed for all of the samples.

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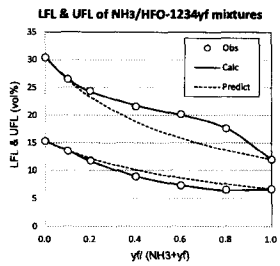
Flammability limits of binary mixtures of ammonia with HFO-1234yf, HFO-1234ze, HFC-134a, and HFC-125

Shigeo Kondo, Kenji Takizawa, Kazuaki Tokuhashi

National Institute of Advanced Industrial Science and Technology (AIST), Central 5, 1-1-1, Higashi, Tsukuba, Ibaraki 305-8565, Japan



► Flammability limits of binary mixtures of NH_3 were measured at 35 °C. ► The counterpart gases are HFO-1234yf, HFO-1234ze, HFC-134a, and HFC-125. ► Flammability limits of NH_3 and HFO-1234yf mixtures deviated much from Le Chatelier's prediction. ► Ellipse modified equation was introduced to explain the result. ► Extension of Ellipse modified equation was made to explain the result for the mixtures of the other three gases.

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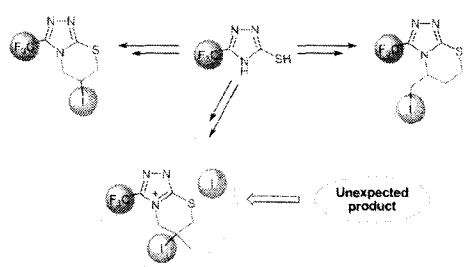
Synthesis of novel fluorine- and iodine-containing [1,2,4]triazolo[3,4-*b*][1,3]thiazines based 3-(alkenylthio) -5-(trifluoromethyl)-4*H*-1,2,4-triazole-3-thiols

Elena S. Il'inykh[a], Dmitry G. Kim[a], Mikhail I. Kodess[b], Evgeniya G. Matochkina[b], Pavel A. Slepukhin[b]

[a]*Department of Chemistry, South Ural State University, 76 Lenin Avenue, Chelyabinsk 454080, Russian Federation*

[b]*I. Ya. Postovsky Institute of Organic Synthesis, Ural Branch of the Russian Academy of Sciences, 22 S. Kovalevskoy/20 Academicheskaya, Yekaterinburg 620990, Russian Federation*



► S-alkenation of 5-(trifluoromethyl)-4*H*-1,2,4-triazole-3-thiol. ► Regiospecifical iodination of the S-alkenyl derivatives obtained. ► Facile synthesis of new fluorine- and iodine-containing [1,2,4]triazolo[3,4-*b*]thiazines.

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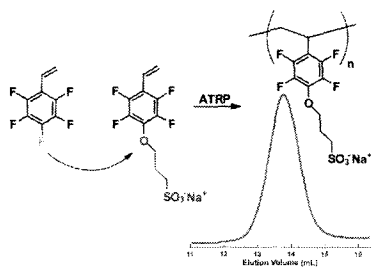
Synthesis and ATRP of novel fluorinated aromatic monomer with pendant sulfonate group

Ivaylo Dimitrov, Katja Jankova, Søren Hvilsted

Danish Polymer Centre, Department of Chemical and Biochemical Engineering, Technical University of Denmark, Søltofts Plads, Building 227, Kongens Lyngby 2800, Denmark



► A fluorinated aromatic monomer with pendant sulfonate group was synthesized. ► The monomer was homopolymerized in controlled manner under aqueous ATRP conditions. ► A diblock copolymer was also obtained. ► The polymers' thermal properties were evaluated.

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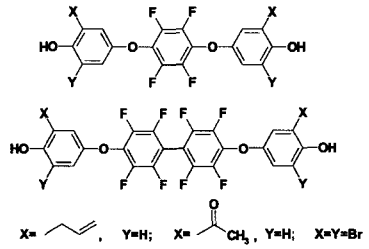
Fluorinated allyl-, acetyl-, and bromo-containing hydroxyl-substituted phenyl ethers with a hexafluorobenzene or decafluorobiphenyl central unit

Igor Tkachenko[a], Oleg Shekera[a], Valery Bliznyuk[b], Valery Shevchenko[a]

[a]*Institute of Macromolecular Chemistry of the National Academy of Sciences of Ukraine, 48, Kharkivske Shosse, Kiev 02160, Ukraine*

[b]*Materials Science and Engineering Department, Clemson University, Clemson, SC 29634, USA*



► Novel allyl-, acetyl-, and bromo-containing monomers with a hexafluorobenzene or decafluorobiphenyl fragments were synthesized. ► Optimal conditions for Claisen and Fries rearrangements were found and described. ► The ability of the synthesized compounds to form hydrogen bonds was investigated. ► The synthesized compounds can be used as monomers for synthesis of nucleus-fluorinated aromatic polymers with various functional groups.

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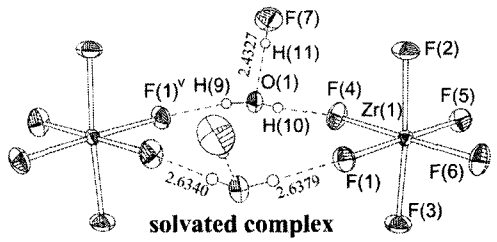
Synthesis and study of tetramethylammonium hexafluoridozirconate and hexafluoridohafnate solvated by $H_2O{\cdot}HF$ adducts and $[N(CH_3)_4]_2ZrF_6$

Andrey V. Gerasimenko, Ruven L. Davidovich, Vera B. Logvinova, Kseniya A. Gaivoronskaya, Elena I. Voit, Evgenii B. Merkulov

Institute of Chemistry, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok 690022, Russia



► A new type of zirconium and hafnium fluoride complexes of the composition $[N(CH_3)_4]_2AF_6{\cdot}(H_2O{\cdot}HF)$ (A = Zr, Hf) solvated by $H_2O{\cdot}HF$ adducts and the compound $[N(CH_3)_4]_2ZrF_6$ have been synthesized. ► The compounds were studied by means of X-ray diffraction, IR and Raman spectroscopy, thermogravimetry and quantum chemistry methods. ► The structural change during the desolvation of $[N(CH_3)_4]_2ZrF_6{\cdot}(H_2O{\cdot}HF)$ has been investigated.

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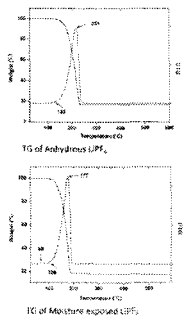
Decomposition kinetics of anhydrous and moisture exposed $LiPF_6$ salts by thermogravimetry

M.D.S. Lekgoathi, B.M. Vilakazi, J.B. Wagener, J.P. Le Roux, D. Moolman

Department of Applied Chemistry, Research and Development Division, The South African Nuclear Energy Corporation Limited, P.O. Box 582, Pretoria 0001, South Africa



► We show that the E_a for the thermal decomposition of anhydrous $LiPF_6$ is different from that of moisture exposed $LiPF_6$. ► A decomposition rate constant of $LiPF_6$ at 298.15 K is deduced. ► The effect of the TG experimental sample size on the activation energy and pre-exponential factor is discussed. ► It is shown that $LiPF_6$ exposed to anhydrous HF shows an IR spectrum similar to $LiPF_6$ exposed to atmospheric moisture.

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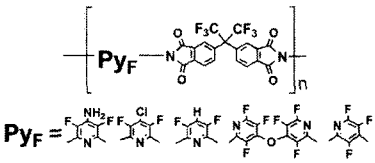
Synthesis and characterization of novel fluorinated pyridine-based polyimides

Tamara A. Vaganova, Inna K. Shundrina, Soltan Z. Kusov, Vladimir I. Rodionov, Evgenij V. Malykhin

N.N. Vorozhtsov Novosibirsk Institute of Organic Chemistry, Siberian Branch of the Russian Academy of Sciences, Lavrentiev Avenue 9, 630090 Novosibirsk, Russian Federation



► New polyimides (Py-PIs) based on fluorinated γ-X-pyridylenediamines were prepared. ► Oxydianiline co-monomer was used to prepare PI films with good mechanical properties. ► Py-PIs are soluble in amide solvents and have good thermooxidative characteristics. ► Pyrolysis parameters for consecutive elimination of F, Cl, H, and N were found.

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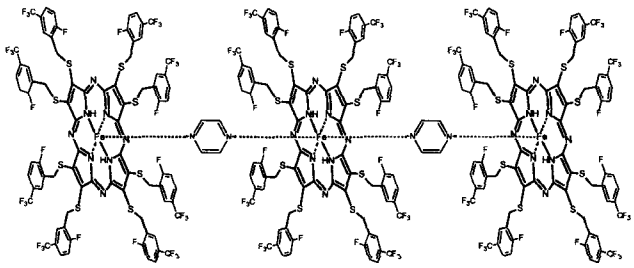
Highly symmetrical polyfluorinated porphyrazines

Ergün Gonca

Fatih University, Department of Chemistry, TR 34500 Büyükçekmece, İstanbul, Turkey

► Novel soluble polyfluorinated porphyrazines are synthesized. ► Solubility of metallo porphyrazines in common solvents is enhanced. ► The synthesis of monomeric bisaxial complex was realized. ► The shish kebab type olygomer was synthesized with bidentate ligands.



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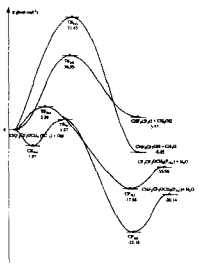
Theoretical studies on the reactions of $CHF_2CF_2OCH_3/CH_2FCF_2OCH_3$ with OH radicals

Li Wang[a], Jianxiang Zhao[a], Hongqing He[b], Jinglai Zhang[a]

[a]*Institute of Environmental and Analytical Sciences, College of Chemistry and Chemical Engineering, Henan University, Kaifeng, Henan 475004, PR China*

[b]*Wuhan Center for Magnetic Resonance, State Key Laboratory of Magnetic Resonance and Atomic and Molecular Physics, Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences, Wuhan 430071, PR China*

► The mechanisms of $CHF_2CF_2OCH_3/CH_2FCF_2OCH_3$ with OH radical are studied theoretically. ► The displacement processes are also considered. ► The dynamics properties are calculated by dual-level (X//Y) direct dynamics methods.



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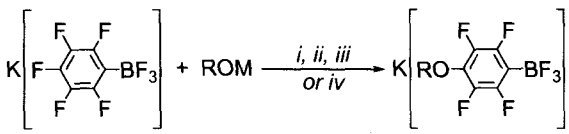
Synthesis of $K[4\text{-}ROC_6F_4BF_3]$ from potassium pentafluorophenyltrifluoroborate and O-nucleophiles

Anton Yu. Shabalin[a], Nicolay Yu. Adonin[a], Vadim V. Bardin[ab], Sergey A. Prikhod'ko[a], Maria N. Timofeeva[a], Maria V. Bykova[a], Valentin N. Parmon[a]

[a]*G.K. Boreskov Institute of Catalysis, SB RAS, Acad. Lavrentjev Avenue 5, 630090 Novosibirsk, Russian Federation*

[b]*N.N. Vorozhtsov Novosibirsk Institute of Organic Chemistry, SB RAS, Acad. Lavrentjev Avenue 9, 630090 Novosibirsk, Russian Federation*



i: R = Me, Et, Pr, *i*-Pr, Bu, $PhCH_2$; M = Na; DMF, 130 °C, 4 h.
ii: R = Allyl; M = Na; DMF, 100 °C, 4 h.
iii: R = *t*-Bu; M = K; DME, 25 °C, 3 h.
iv: R = Ph; M = K; DMSO, 130 °C, 4 h.

► A new method for preparation of potassium polyfluoroaryltrifluoroborates, $K[4\text{-}ROC_6F_4BF_3]$, was developed. ► This method is based on a reaction of potassium pentafluorophenyltrifluoroborate with O-nucleophiles. ► The O-nucleophiles attack a carbon center of the aromatic ring in the *para*-position to BF_3 group of $K[C_6F_5BF_3]$.

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Effects of surface fluorination on the electrochemical properties and thermal stability of $LiFePO_4$ cathode for lithium-ion batteries

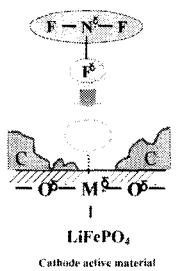
Miki Ueda[a], Meguru Ohe[ac], Jae-Ho Kim[a], Susumu Yonezawa[ab], Masayuki Takashima[b]

[a]*Department of Materials Science and Engineering, Faculty of Engineering, University of Fukui, 3-9-1 Bunkyo, Fukui 910-8507, Japan*

[b]*Cooperative Research Center, University of Fukui, 3-9-1 Bunkyo, Fukui 910-8507, Japan*

[c]*Central Glass Co., Ltd., 5253 Oaza Okibu, Ube, Yamaguchi 755-0001, Japan*

► Fluorinated $LiFePO_4$ (F-$LiFePO_4$) cathode active materials were prepared using NF_3 gas. ► The discharge capacity of F-$LiFePO_4$ was 10% higher than that of untreated $LiFePO_4$. ► F1-$LiFePO_4$ indicated the lowest resistance and largest exchange current density. ► DSC results proved that the surface fluorination can improve the thermal stability of $LiFePO_4$.



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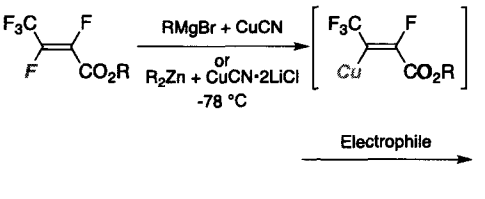
Fluorine–copper exchange reaction of α,β,γ,γ,γ-pentafluorocrotonates with organocuprates: Generation and cross-coupling reactions of β-metallated α,γ,γ,γ-tetrafluorocrotonates



Shigeyuki Yamada, Toshio Takahashi, Tsutomu Konno, Takashi Ishihara

Department of Chemistry and Materials Technology, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606-0962, Japan

► Addition–elimination reaction with organocuprates furnished vinylcopper species. ► The *in situ* generated vinylcopper species was stable at −78 °C. ► The vinylcopper species reacted with various electrophiles. ► Fluorine-containing tetra-substituted alkenes were obtained in a single operation.

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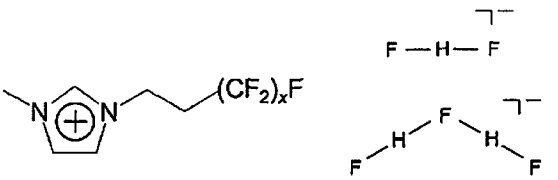
Effects of the polyfluoroalkyl side-chain on the properties of 1-methyl-3-polyfluoroalkylimidazolium fluorohydrogenate ionic liquids



Ryosuke Taniki, Naoki Kenmochi, Kazuhiko Matsumoto, Rika Hagiwara

Graduate School of Energy Science, Kyoto University, Sakyo-ku, Kyoto 606-8501, Japan

► We synthesized and characterized a series of 1-methyl-3-polyfluoroalkylimidazolium fluorohydrogenate salts. ► Introduction of polyfluoroalkyl side-chain increases density and viscosity and decreases ionic conductivity. ► The liquid crystal phase was observed for $C_{8F13}MIm(FH)_{2.0}F$ and $C_{10F17}MIm(FH)_{2.0}F$. ► Formation of the liquid crystal phase is promoted by the interaction between the polyfluoroalkyl side-chains.

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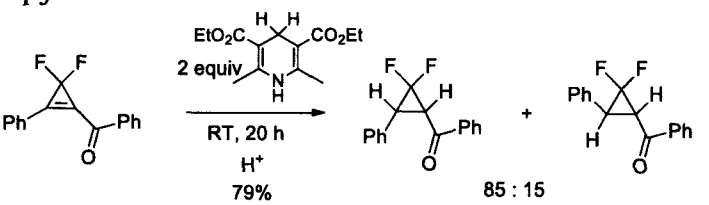
Cis-selective preparation of 2,2-difluorocyclopropyl ketones via non-metal hydride reduction of 2,2-difluorocyclopropenyl ketones



Zhaoyun Zheng, William R. Dolbier Jr.

Department of Chemistry, University of Florida, Gainesville, FL 32611-7200, United States

► *Cis*-selective reduction of *gem*-difluorocyclopropenyl ketones to form 3-substituted-2,2-difluorocyclopropyl ketones. ► Hantzsch ester is a potent hydride donor under acid catalysis. ► *Cis*-3-substituted-2,2-difluorocyclopropyl ketones are prepared in very good yield.

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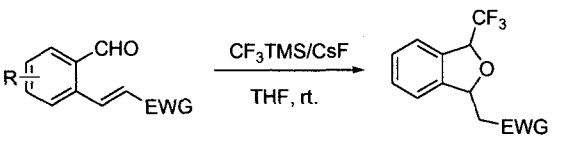
Tandem nucleophilic addition-intramolecular oxa-Michael reaction: Novel synthetic route to trifluoromethylated phthalans



Hongling Yuan, Yuefa Gong

School of Chemistry and Chemical Engineering, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan 430074, PR China

► Synthesis of trifluoromethylated phthalans. ► Tandem nucleophilic addition of trifluoromethyl anion and intraolecualr oxa-Michael reaction. ► Temperature-dependent intramolecular oxa-Michael addition.

R = H, NO_2, 3,4-OCH_2O

EWG = COAr, COOR, CN

12 examples, yields 57-91%

dr 1.5:1-4.0:1