Electronic supplementary Information

Sustainability in a can: upcycling aluminium scrap in the wasteminimized electrochemical synthesis of 2-oxazoline

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Table of Contents

1. General Remarks	. ESI – 2
2. General Procedures	ESI – 2
3. Green Metrics Analysis	. ESI – 2
4.Electrode preparation	. ESI – 7
5.Electrochemical experimental setup	.ESI – 7
6.Characterization Data	ESI – 8
7.Copies of the NMR spectra	ESI – 27

1. General Remarks

Unless otherwise stated, all chemicals were purchased and used without any further purification. GLC analyses were performed by using Hewlett-Packard HP 5890 SERIES II equipped with a capillary column DB-5MS (30 m, 0.32 mm), a flame ionization detector (FID), and helium as gas carrier. GC-EIMS analyses were carried out by using a Hewlett-Packard HP 6890 N Network GC system/5975 mass selective detector equipped with an electron impact ionizer at 70 eV. Melting points were measured on a Büchi 510 apparatus. NMR spectra were recorded on a Bruker DRX-ADVANCE 400 MHz (¹H at 400 MHz, ¹³C at 100.6 MHz and ¹⁹F at 376.4 MHz) in CDCl₃. Chemical shifts are reported in ppm (δ), coupling constant (J) in Hertz, and multiplicity are reported as follows: s=singlet, bs=broad singlet, d=doublet, dd=double doublet, td=double triplet, t=triplet, m=multiplet. Enantiomeric excesses were determined by chiral high performance liquid chromatography (HPLC) analysis using CHIRALCEL OD-H column, (Hexane:iPrOH 80/20). Elemental analysis (EA) was conducted on Elementar UNICUBE® elemental analyzer. Products purification was performed through filtration on silica plug using 230-400 mesh silica gel. Cyclic voltammetry (CV) experiments were carried using an IKA Electrasyn 2.0 apparatus. Electrodes were polished using polishing pad and Al_2O_3 powder. IUPAC convention to report voltammetry were used using 0V as initial potential and 200 mV/s sweep.

2. General Procedures

General Procedure A

In a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (4 mmol), aldehyde (**1a-I**) (1 mmol), aminoalcohol (**2-2a**) (1-2 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7-12 F/mol of current were passed (depending on the substrate used). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent = petroleum ether : ethyl acetate in different proportion) which gives the product (**3a-t**).

General procedure Large Scale Synthesis

In a 250 mL flask without cap equipped with a magnetic stirrer and two electrodes system (graphite anode and aluminium cathode) LiBr (40 mmol), aldehyde **1a** (10 mmol), ethanolamine (10 mmol) and 100 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 1 A under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure and the solvent has been recovered in 87% respect to initial weight. The resulting mixture was extracted by using ethyl acetate (10 mL) and water (5 mL). After concentration under reduced pressure, the crude product was recrystallized using a little amount of EtOAc and petroleum ether under low temperatures (-20 °C), giving the product **3a** as a white crystal in 92% yield (1.52 g).

3. Green Metrics analysis

Green Chem., 2021, 23, 7982

E-factor (E) =[(0.0806+0.1224+0.1085+8.6400) - 0.1048]/0.1048 = 84.374 Process Mass Intensity (1+E = PMI) = 85.374 Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 1.2% Yield = 74%



RSC Adv., 2014, 4, 39897-39900

E-factor (E) =[(0.1061+0.0901+0.2703+3.99+0.0332+3.0000+2.7000+3.6000) - 0.1193]/0.1193 = 114.588 Process Mass Intensity (1+E = PMI) = 115.588 Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 0.9% Yield = 74%



VMR = 0.66

Tetrahedron, 2007, 63, 1474–1480

E-factor (E) =[(0.1202+0.0672+0.5070+0.4166+7.8100+5.0000+3.5600+6.0000) - 0.1418]/0.1418 = 164.592 Process Mass Intensity (1+E = PMI) = 165.592 Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 0.6%

Yield = 88%



Org. Lett., 2015, 17, 1453

E-factor (E) =[(0.2000+0.2120+0.4392+7.8600+0.0580+10.0000+13.0000) - 0.1362]/0.1362 = 232.254

Process Mass Intensity (1+E = PMI) = 233.254Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 0.4%

Yield = 62%



VMR = 0.43

Synthesis, 2006, 2996

E-factor (E) =[(0.1061+0.0891+0.1779+1.500+7.9800+40.0000+10.0000) - 0.1437]/0.1437 = 415.514 Process Mass Intensity (1+E = PMI) = 416.514 Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 0.2% Yield = 82%



VMR = 0.70

ChemCatChem, 2021, **13**, 3410

E-factor (E) =[(0.0530+0.0916+0.0550+3.3000+0.0034+27.0600) - 0.0654]/0.0654 = 465.685 Process Mass Intensity (1+E = PMI) = 466.685 Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 0.2% Yield = 89%



VMR = 0.62

Synlett 2007, 12, 1921

E-factor (E) =[(0.1201+0.0610+0.3865+11.7900+39.9000+15.0000) - 0.1160]/0.1160 = 578.508 Process Mass Intensity (1+E = PMI) = 579.508 Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 0.2% Yield = 72%



This work gram scale:

 $\begin{array}{l} \mbox{E-factor (E) =}[(1.2400 + 0.6100 + 3.4700 + 39.3000 + 39.6000 + 9.0200 + 5.0000) - 1.5000 - 68.6400_{(recovered solvent)}]/1.500 = 18.733 \\ \mbox{Process Mass Intensity (1+E = PMI) = 19.733} \\ \mbox{Reaction Mass Efficiency (1/(1+E) * 100 = RME) = 5.1\%} \\ \mbox{Yield = 92\%} \end{array}$



VMR = 0.73

4. Electrodes preparation

The upcycled aluminium electrode is prepared by simply cutting a rectangular portion from a spent can (figure S1a). To achieve an adequate thickness (almost 1 mm) the previously cut portion can be folded on itself and subsequently pressed (figure S1b). The final rectangular portion has a surface of 1 cm x 7 cm. The commercial graphite anode is obtained by cutting out a rectangular portion of equal dimension (figure S1c, figure S1d). The electrode system is constructed by sealing the two electrodes and adapting a small plastic spacer to obtain a separation of 5 mm (figure S1d, figure S1f).



Figure S1: Electrode system construction starting from the spent aluminium can.

5. Experimental setup

The experimental setup is constructed by adapting the electrode system into a beaker-type reactor via a clamp (figure S2). The system is anchored ensuring an immersion of the electrodes to a depth of at least 3 cm. The system is therefore connected to a programmable DC power supply AXIOMET (AX-3003P). To ensure magnetic stirring, a common laboratory plate is used.



Figure S2: Experimental setup composed of reactor and programmable DC power supply.

6. Characterization Data

Chem. Name	2-(4-fluorophenyl)-2-oxazoline (3a)				
Lit. Ref.	T. M. Maiden,	T. M. Maiden, S. Swanson, P. A. Procopiou and J. P. Harrity, Chemistry			
	– A European	– A European Journal, 2015, 21 , 14342–14346.			
F 1a	$\begin{array}{cccc} & & & & & C(+) - Al(-) \\ & & & & LiBr \ 0.4M \\ & & & & \\ & & OH & CH_3CN:MeOH \ 1:1 \ 0.1M \\ & & & 100 \ mA, \ r.t., \ 7 \ F/mol \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & & \\ & &$				

Method:

Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-fluorobenzaldehyde **1a** (124.12 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3a** as a white crystal (145.4 mg, 88% yield).

Elemental analysis: Calc: C: 65.45; H: 4.88; F: 11.50; N: 8.48; Found: C: 65.44; H: 4.89; F: 11.52; N: 8.47

Mol. Formula	C ₉ H ₈ FNO	m.p.	138-140 °C	
		-		
	δ value:	No. H	Mult	J value/Hz
¹ H NMR (400 MHz	7.92	2	m	
CDCI ₃)	7.06	2	t	8.7
	4.40	2	t	9.5
	4.02	2	t	9.5
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 164.8 (d, J _{C-F} = 217.5 Hz), 163.4, 130.4 (d, J _{C-F} = 8.8 Hz), 124.0				
(d, J _{C-F} = 3.0 Hz), 115.5 (d, J _{C-F} = 22.0 Hz), 67.7, 54.9.				

¹⁹F NMR (376 MHz, CDCl₃) δ: -108.3

GC-EIMS (m/z, %): 165(45), 135(100), 109(15), 95(35), 75(21).



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-chlorobenzaldehyde **1b** (140.58 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3b** as a white crystal (156.2 mg, 86% yield).

Elemental analysis: Calc: C: 59.52; H: 4.44; Cl: 19.52; N: 7.71; Found: C: 59.54; H: 4.43; Cl: 19.53; N: 7.72

Mol. Formula	C9H8NO	m.p.	139-141 °C	
	δ value:	No. H	Mult	J value/Hz
¹ H NMR (400 MHz	7.86	2	d	8.5
CDCI ₃)	7.36	2	d	8.5
	4.41	2	t	9.5
	4.03	2	t	9.5
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 163.8, 137.4, 129.5, 128.6, 126.2, 67.8, 55.0.				

GC-EIMS (m/z, %): 183(19), 181(58), 153(33), 151(100), 111(25), 75(26).

Chem. Name	2-(3-fluorophenyl)-2-oxazoline (3c)			
Lit. Ref.	R. Zhao, M. Yan, R. Zhang, Y. Ma and J. Chen, <i>ChemistrySelect</i> , 2019, 4 , 10907–10910.			
F 1c	$\begin{array}{cccc} & & & & C(+) - Al(-) \\ & & & LiBr \ 0.4M \\ & & & \\ OH & CH_3CN:MeOH \ 1:1 \ 0.1M \\ & & 100 \ mA, \ r.t., \ 7 \ F/mol \\ & & & \\ \end{array}$			
Method:				
Prepared according to	general procedure A: in a 10mL vial without cap equipped with a magnetic			

stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 3-fluorobenzaldehyde **1c** (124.12 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3c** as an oil (137.1 mg, 83% yield).

Elemental analysis: Calc: C: 65.45; H: 4.88; F: 11.50; N: 8.48; Found: C: 65.43; H: 4.88; F:

11.51; N: 8.49

	1		1	
Mol. Formula	C ₉ H ₈ FNO	m.p.	oil	
¹H NMR (400 MHz, CDCl₃)	δ value:	No. H	Mult	J value/Hz
	7.70	1	d	7.8
	7.61	1	m	
	7.34	1	m	
	7.14	1	m	
	4.40	2	t	9.6
	4.03	2	t	9.6

¹³**C NMR (100.6 Hz, CDCI₃)** δ: 163.6 (d, $J_{C-F} = 3.2$ Hz), 162.5 (d, $J_{C-F} = 246.1$ Hz), 130.0 (d, $J_{C-F} = 8.0$ Hz), 129.8, 123.9 (d, $J_{C-F} = 3.1$ Hz), 118.3 (d, $J_{C-F} = 21.3$ Hz), 115.3 (d, $J_{C-F} = 23.5$ Hz), 67.8, 54.9.

¹⁹F NMR (376 MHz, CDCI₃) δ: - 112.7

GC-EIMS (m/z, %): 165(37), 135(100), 109(11), 95(43), 75(22).



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 3-chlorobenzaldehyde **1d** (140.58 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3d** as a white crystal (158.0 mg, 87% yield).

Elemental analysis: Calc: C: 59.52; H: 4.44; Cl: 19.52; N: 7.71; Found: C: 59.54; H: 4.44; Cl: 19.51; N: 7.69

Mol. Formula	C ₉ H ₈ FNO	m.p.	oil	
	δ value:	No. H	Mult	J value/Hz
	7.92	1	d	7.8
	7.80	1	m	
	7.42	1	m	
	7.32	1	m	
	4.41	2	t	9.6
	4.03	2	t	9.6
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 163.5, 134.4, 131.3, 129.6, 129.4, 128.3, 126.3, 67.8, 54.9.				
GC-EIMS (m/z, %): 183(23), 181(59), 153(42), 151(100), 111(27), 75(31).				

Chem. Name	2-(2-bromophenyl)-2-oxazoline (3e)				
Lit. Ref.	A. Y. Hong, N. B. Bennett, M. R. Krout, T. Jensen, A. M. Harned and B. M. Stoltz, <i>Tetrahedron</i> , 2011, 67 , 10234–10248.				
Br O	H + $(NH_2 \ H_3CN:MeOH \ 1:1 \ 0.1M \ 100 \ mA, r.t., 7 \ F/mol$ $(NH_2 \ H_3CN:MeOH \ 1:1 \ 0.1M \ H_3CN:MeOH \ H_3CN:M$				
Method:					
Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 2-bromobenzaldehyde 1e (185.02 mg, 1 mmol), ethanolamine 2 (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH ₃ CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it					

was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3e** as an oil (165.0 mg, 73% yield).

Elemental analysis: Calc: C: 47.82; H: 3.57; Br: 35.34; N: 6.20; Found: C: 47.80; H: 3.58; Br:

Mol. Formula	C ₉ H ₈ BrNO	m.p.	oil	
	δ value:	No. H	Mult	J value/Hz
	7.73	1	dd	7.8, 2.6
	7.66	1	dd	7.8, 2.6
CDCI ₃)	7.36	1	m	
	7.28	1	m	
	4.46	2	t	9.6
	4.13	2	t	9.6
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 165.1, 138.7, 131.2, 130.5, 129.8, 127.2, 125.6, 66.8, 56.3, 21.8.				
GC-EIMS (m/z, %): 228(64), 226(65), 198(98), 196(100), 116(74), 89(55), 75(32), 50(31).				



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 3,5-dichlorobenzaldehyde **1f** (175.01 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 9:1 petroleum ether: ethyl acetate) which gives the product **3f** as a white crystal (183.7 mg, 85% yield).

Elemental analysis: Calc: C: 50.03; H: 3.27; Cl: 32.81; N: 6.48; Found: C: 50.05; H: 3.27; Cl: 32.82; N: 6.47

Mol. Formula	C ₉ H ₈ FNO	m.p.	62-64 °C	
	δ value:	No. H	Mult	J value/Hz
¹ H NMR (400 MHz	7.80	1	d	2.0
CDCI ₃)	7.43	2	t	2.0
	4.43	1	t	9.6
	4.04	1	t	9.6
¹³ C NMR (100.6 Hz, CDCI ₃) δ: 162.5, 135.1, 131.1, 130.5, 126.6, 68.1, 55.0.				
GC-EIMS (m/z, %): 217(33), 215(50), 187(67), 185(100).				



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-bromo-3-fluorobenzaldehyde **1g** (203.01 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3g** as a white crystal (205.0 mg, 84% yield).

Elemental analysis: Calc: C: 44.29; H: 2.89; Br: 32.74; F: 7.78; N: 14.58; Found: C: 56.24; H:

4.19; Cl; N: 14.59

Mol. Formula	C ₉ H ₇ BrFNO	m.p.	102-104 °C	
				1
	δ value:	No. H	Mult	J value/Hz
	8.76	1	t	2.1
¹ H NMR (400 MHz,	8.30	2	m	
CDCI ₃)	7.60	1	t	8.0
	4.50	2	t	9.6
	4.11	2	t	9.6
13 C NMP (100 G Hz CDCL) &: 162 0 (d L_ = - 2.8 Hz) 158 8 (d L_ = - 247 G Hz) 133 5 120 0				

¹³**C NMR (100.6 Hz, CDCI₃)** δ : 162.9 (d, J_{C-F} = 2.8 Hz), 158.8 (d, J_{C-F} = 247.6 Hz), 133.5, 129.0 (d, J_{C-F} = 7.5 Hz), 124.8 (d, J_{C-F} = 3.7 Hz), 116.1 (d, J_{C-F} = 24.4 Hz), 112.5 (d, J_{C-F} = 21.0 Hz), 68.2, 55.1.

¹⁹F NMR (376 MHz, CDCl₃) δ: -106.5

GC-EIMS (m/z, %): 245(63), 243(66), 214(97), 212(100), 135(26), 107(27), 94(37).



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-cyanobenzaldehyde **1h** (131.14 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3h** as a white crystal (120.5 mg, 70% yield).

Elemental analysis: Calc: C: 69.76; H: 4.68; N: 16.27; Found: C: 69.75; H: 4.69; N: 8.45					
Mol. Formula	C ₁₀ H ₈ N ₂ O	m.p.	112-114 °C		
	δ value:	No. H	Mult	J value/Hz	
¹H NMR (400 MHz, CDCl₃)	8.01	2	d	8.1	
	7.67	2	d	8.1	
	4.45	2	t	9.6	
	4.07	2	t	9.6	
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 163.1, 133.1, 132.1, 128.7, 118.3, 114.7, 68.1, 56.0.					
GC-EIMS (m/z, %): 172(46), 142(100), 102(27).					



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-methyl-3-nitrobenzaldehyde **1i** (165.15 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 8 F/mol of current were passed (ca. 130 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3i** as a white crystal (152.6 mg, 74% yield).

Elemental analysis: Calc: C: 44.29; H: 2.89; Br: 32.74; F: 7.78; N: 14.58; Found: C: 56.24; H: 4.19; Cl; N: 14.59

Mol. Formula	C ₉ H ₇ BrFNO	m.p.	153-155 °C	
	δ value:	No. H	Mult	J value/Hz
	8.76	1	t	2.1
¹ H NMR (400 MHz,	8.30	2	m	
CDCI ₃)	7.60	1	t	8.0
	4.50	2	t	9.6
	4.11	2	t	9.6
¹³ C NMR (100.6 Hz, CDCl₃) δ: 162.7, 148.2, 133.9, 129.6, 129.5, 125.8, 123.2, 68.2, 55.1.				
GC-EIMS (m/z, %): 206(46), 191(100), 177(58), 145(14).				



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-nitrobenzaldehyde **1j** (151.12 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 8 F/mol of current were passed (ca. 130 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 7:3 petroleum ether: ethyl acetate) which gives the product **3j** as an orange crystal (136.5 mg, 71% yield).

emental analysis: Calc: C: 56.25; H: 4.20; N: 14.58; Found: C: 56.27; H: 4.19; N: 14.57

Mol. Formula	C ₉ H ₈ FNO	m.p.	177-179 °C	
¹ H NMR (400 MHz, CDCl₃)	δ value:	No. H	Mult	J value/Hz
	8.23	2	d	8.6
	8.08	2	d	8.6
	4.47	2	t	9.6
	4.09	2	t	9.6
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 162.9, 149.4, 133.5, 129.2, 123.5, 68.2, 55.2.				

GC-EIMS (m/z, %): 192(45), 162(100), 116(57), 90(25), 89(57), 77(44), 76(65), 63(39), 51(21).



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 3-nitrobenzaldehyde **1k** (151.12 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 8 F/mol of current were passed (ca. 130 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 7:3 petroleum ether: ethyl acetate) which gives the product **3k** as a white crystal (174.9 mg, 91% yield).

Elemental analysis: Calc: C: 56.25; H: 4.20; N: 14.58; Found: C: 56.24; H: 4.19; Cl; N: 14.59				
Mol. Formula	$C_9H_8N_2O_3$	m.p.	118-120 °C	
	δ value:	No. H	Mult	J value/Hz
	8.76	1	t	2.1
¹ H NMR (400 MHz,	8.30	2	m	
CDCI ₃)	7.60	1	t	8.0
	4.50	2	t	9.6
	4.11	2	t	9.6
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 162.7, 148.2, 133.9, 129.6, 129.5, 125.8, 123.2, 68.2, 55.1.				
GC-EIMS (m/z, %): 192(38), 162(100), 116(51), 90(38), 89(33), 76(61), 63(48).				

Chem. Name	2-(pyridine-2-yl)-2-oxazoline (3I)		
Lit. Ref.	X. Li, B. Zhou, J. Zhang, M. She, S. An, H. Ge, C. Li, B. Yin, J. Li and Z. Shi, <i>European Journal of Organic Chemistry</i> , 2012, 2012 ,1626–1632.			
	H + (NH ₂ OH 2	C(+) - Al(-) LiBr 0.4M CH ₃ CN:MeOH 1:1 0.1M 100 mA, r.t., 7 F/mol	0 N 3I MW: 148.17	

Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), picolinaldehyde **1I** (107.11 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 4:6 petroleum ether: ethyl acetate) which gives the product **3I** as a white crystal (115.6 mg, 78% yield).

mental analysis: Calc: C: 64.85; H: 5.44; N: 18.91; Found: C: 64.86; H: 5.44; N: 18.90
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Mol. Formula	C ₈ H ₈ N ₂ O	m.p.	44-46 °C	
¹ H NMR (400 MHz, CDCl₃)	δ value:	No. H	Mult	J value/Hz
	8.68	1		
	8.02	1		
	7.76	1		
	7.38	1		
	4.51	2		
	4.11	2		
¹³ C NMR (100.6 Hz, CDCI ₃) δ: 163.9, 149.7, 146.7, 136.6, 125.5, 123.8, 68.2, 55.1.				
GC-EIMS (m/z, %): 148(100), 118(43), 78(16).				







Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 4-propoxybenzaldehyde **1o** (164.20 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3o** as a colourless oil (127.3 mg, 62% yield).

Mol. Formula	$C_{12}H_{15}NO_2$	m.p.	oil	
	δ value:	No. H	Mult	J value/Hz
	7.85	2	d	8.8
	6.88	2	d	8.8
¹ H NMR (400 MHz,	4.37	2	t	9.5
CDCI ₃)	4.00	2	t	9.5
	3.92	2	t	6.6
	1.79	2	h	7.2
	1.01	3	t	7.4
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 164.5, 161.6, 129.8, 120.0, 114.2, 69.5, 67.5, 54.8, 22.5, 10.5.				
GC-EIMS (m/z, %): 205(61), 163(43), 162(24), 133(100), 121(22).				



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 2-naphthaldehyde **1p** (156.18 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3p** as a white crystal (144.0 mg, 73% yield).

nalysis: Calc: C: 79.17; H: 5.62; N: 7.10; Found: C: 79.18; H: 5.63; N: 7.09
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Mol. Formula	C ₁₃ H ₁₁ NO	m.p.	83-85 °C	
				1
	δ value:	No. H	Mult	J value/Hz
¹ H NMR (400 MHz, CDCl₃)	8.44	1	s	
	8.04	1	dd	8.6, 1.7
	7.98-7.78	3	m	
	7.52	2	m	
	4.46	2	t	9.5
	4.10	2	t	9.5
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 164.8, 134.7, 132.7, 128.9, 128.7, 128.1, 127.8, 127.5, 126.5,				
125.1, 124.8, 67.7, 55.0.				
GC-EIMS (m/z, %): 198(35), 197(100), 168(44), 167(98), 155(28), 141(32), 127(99), 126(37),				

83(22), 77(16).

Chem. Name	2-phenyl-2-oxazoline (3q)							
Lit. Ref.	M. Trose, F. Lazreg, M. Lesieur and C. S. Cazin, <i>The Journal of</i>							
	Organic Chemistry, 2015, 60, 9910–9914.							
O Iq	$\begin{array}{cccc} & & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & & \\ & & & \\ & & & $							

Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), benzaldehyde **1q** (106.12 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3q** as a colourless oil (120.7 mg, 82% yield).

Elemental analysis:	Calc: C: 73.45;	; H: 6.16; N: 9.52	2; Found: C: 73.43;	H: 6.17; N: 9.53
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Mol. Formula	C ₉ H ₉ NO	m.p.	oil					
	δ value:	No. H	Mult	J value/Hz				
¹ H NMR (400 MH 7	7.97	2	d	6.9				
	7.52-7.42	3	m					
	4.46	2	t	9.6				
	4.09	2	t	9.6				
¹³ C NMR (100.6 Hz, CDCI ₃) δ: 164.7, 131.3, 128.3, 128.2, 127.7, 67.6, 54.9.								
		(- / / / - >					
GC-EIMS (m/z, %): 147	7(82), 117(100), 77	(25), 91(13), -	51(13).					



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (693.6 mg, 8 mmol), terephthalaldehyde **1r** (134.13 mg, 1 mmol), ethanolamine **2** (122.16 mg, 2 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 12 F/mol of current were passed (ca. 194 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 6:4 petroleum ether: ethyl acetate) which gives the product **3r** as a white crystal (140.6 mg, 65% yield).

Elemental analysis: Calc: C: 66.65; H: 5.59; N: 12.96; Found: C: 66.64; H: 5.60; N: 12.98

Mol. Formula	$C_{12}H_{12}N_2O_2$	m.p.	238-240 °C						
	δ value:	No. H	Mult	J value/Hz					
¹ H NMR (400 MHz,	7.95	2	S						
CDCI ₃)	4.41	2	t	9.6					
	4.03	2	t	9.6					
¹³ C NMR (100.6 Hz, CDCI ₃) δ:164.1, 130.2, 128.1, 67.7, 55.0.									
GC-EIMS (m/z, %): 216	6(85), 186(100), 17	4(13), 144(18	6), 116(16), 78(23).						



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), 2-(trifluoromethyl)benzaldehyde **1s** (174.12 mg, 1 mmol), ethanolamine **2** (61.08 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirring until 8 F/mol of current were passed (ca. 130 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 8:2 petroleum ether: ethyl acetate) which gives the product **3s** as a colourless oil (137.7 mg, 64% yield).

Elemental analysis: Calc: C: 55.82; H: 3.75; F: 26.49; N: 6.51; Found: C: 55.81; H: 3.76; F:

Mol. Formula	C10H8F3NO	m.p.	oil						
Mol. Formula C10H8F3NO m.p. oil 1 H NMR (400 MHz, δ value: No. H Mult J value/Hz $^{7.74}$ 2 m 7.755 2 m $^{7.55}$ 2 m 9.6 4.45 2 t 9.6 13 C NMR (100.6 Hz, CDCl ₃) δ : 163.9, 131.6 (q, J _{C-F} = 1.1 Hz), 131.0, 130.5, 129.1 (q, J _{C-F} = Hz), 127.5 (m), 126.6 (q, J _{C-F} = 5.3 Hz), 123.5 (q, J _{C-F} = 273.4 Hz), 68.5, 55.3. 1 ⁹ F NMR (376 MHz, CDCl ₃) δ : -59.8	J value/Hz								
	7.55	2	m						
	4.45	2	t	9.6					
	4.05	2	t	9.6					
¹³ C NMR (100.6 Hz, CI	DCI₃) δ: 163.9, 131.	$6 (q, J_{C-F} = 1.$	1 Hz), 131.0, 130.5,	129.1 (q, J _{C-F} = 32.1					
Hz), 127.5 (m), 126.6 (q, J _{C-F} = 5.3 Hz), 12	3.5 (q, J _{C-F} = 2	273.4 Hz), 68.5, 55.3	3.					
¹⁹ F NMR (376 MHz, CDCl ₃) δ: -59.8									
GC-EIMS (m/z, %): 21	GC-EIMS (m/z, %): 215(58), 185(100), 166(25).								



Prepared according to general procedure A: in a 10mL vial without cap equipped with a magnetic stirrer and a two electrodes system (graphite anode and aluminium cathode) LiBr (346.8 mg, 4 mmol), picolinaldehyde **1I** (107.11 mg, 1 mmol), (S)-2-amino-3-methylbutan-1-ol **2a** (103.17 mg, 1 mmol) and 10 mL of a 1:1 mixture of CH₃CN:MeOH were consecutively added and the resulting mixture was electrolyzed in CCE at 100 mA under stirrinbg until 7 F/mol of current were passed (ca. 110 minutes). After reaction completion the mixture was concentrated under reduced pressure, then it was extracted by using ethyl acetate (3 mL) and water (1 mL). After concentration under reduced pressure, the crude product was isolated with flash chromatographic column on silica gel (eluent 6:4 petroleum ether: ethyl acetate) which gives the product **3t** as a white crystal (159.8 mg, 84% yield).

Mol. Formula	$C_{11}H_{14}N_2O$	m.p.	52-54 °C				
	δ value:	No. H	Mult	J value/Hz			
	8.65	1	d	4.7			
	8.00	1	d	7.9			
	7.71	1	m				
¹ H NMR (400 MHz,	7.32	1	m				
CDCl₃)	4.45	1	t	8.4			
	4.13	2	m				
	1.85	1	dq	13.2, 6.7			
	1.00	3	d	6.8			
	0.89	3	d	6.8			
¹³ C NMR (100.6 Hz, CDCl ₃) δ: 162.5, 149.7, 146.8, 136.6, 125.4, 123.9, 72.9, 70.7, 32.7, 19.0,							
18.1.							
GC-EIMS (m/z, %): 190	0(11), 147(100), 14	6(21), 119(20), 92(31), 78(19).				

7. NMR copies



2-(4-fluorophenyl)-2-oxazoline





65.88 63.72 63.39	30.42 30.33 24.02 23.99 15.54 15.32	57.73	4.92
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2-(4-fluorophenyl)-2-oxazoline



2-(4-fluorophenyl)-2-oxazoline

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2-(4-chlorophenyl)-2-oxazoline



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2-(4-chlorophenyl)-2-oxazoline





2-(3-fluorophenyl)-2-oxazoline







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210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0	-10

2-(3-fluorophenyl)-2-oxazoline




2-(3-chlorophenyl)-2-oxazoline







7.74 7.72 7.72 7.75 7.65 7.65 7.65 7.65 7.38 7.38 7.33 7.33 7.33 7.33 7.33 7.33	4.49 4.46 4.44 4.15 4.13 4.13

2-(2-bromophenyl)-2-oxazoline





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2-(2-bromophenyl)-2-oxazoline



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2-(3,5-dichlorophenyl)-2oxazoline





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2-(3,5-dichlorophenyl)-2oxazoline



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210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0	-10



2-(4-bromo-3-fluorophenyl)-2oxazoline





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2-(4-bromo-3-fluorophenyl)-2oxazoline



2-(4-bromo-3-fluorophenyl)-2oxazoline



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2-(4-cyanophenyl)-2-oxazoline



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2-(4-cyanophenyl)-2-oxazoline

-163.10











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2-(4-methyl-3-nitrophenyl)-2oxazoline

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2-(4-nitrophenyl)-2-oxazoline

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2-(3-nitrophenyl)-2-oxazoline





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2-(pyridin-2-yl)-2-oxazoline



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2-(pyridin-2-yl)-2-oxazoline





2-(2-methylphenyl)-2-oxazoline



3m











2-(4-propoxyphenyl)-2oxazoline





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2-(4-propoxyphenyl)-2oxazoline

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ESI – 60

8.44 8.05 8.05 8.03 8.03 8.03 8.03 7.91 7.91 7.89	.89 .87 .85 .85 .85 .85	<pre>'.56 '.55 '.55 '.53 '.52 '.51 '.51 '.51 '.49 '.48</pre>	1.49 1.46 1.44 1.12 1.10

2-(naphthalen-2-yl)-2oxazoline







2-(naphthalen-2-yl)-2oxazoline



ESI – 62



2-phenyl-2-oxazoline









ESI – 65

1,4-bis(4,5-dihydrooxazol-2yl)benzene



3r



7.77 7.75 7.75 7.75 7.75 7.55 7.55 7.55	4.47 4.45 4.42 4.08 4.03

2-(2-(trifluoromethyl)phenyl)-2oxazoline

CF₃O

3s





2-(2-(trifluoromethyl)phenyl)-2oxazoline



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210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0	-10	
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2-(2-(trifluoromethyl)phenyl)-2oxazoline



3s

20 -10 -20 -40 -50 -70 -80 -90 -100 -190 -200 -210 10 -30 -60 -110 -120 -130 -140 -150 -160 -170 -180 -220 0 ppm



(S)-4-isopropyl-2-(pyridin-2-yl)-4,5dihydrooxazole

0 N 3t





(S)-4-isopropyl-2-(pyridin-2-yl)-4,5dihydrooxazole



-10