

Screening Test Results ST1.

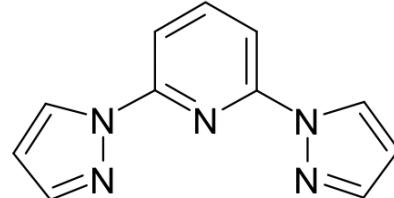
Compound name: **2,6-bis(pyrazol-1-yl)pyridine**

Acronym: N-DPP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 18/7/2008



Organic phase composition: 10 mM N-DPP in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.98 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Organic phase composition: 10 mM N-DPP in 1-octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.98 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Screening Test Results ST2.

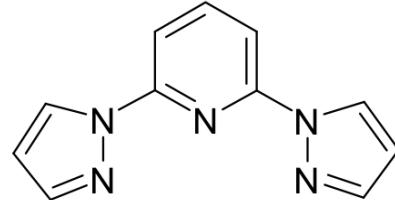
Compound name: **2,6-bis(pyrazol-1-yl)pyridine**

Acronym: N-DPP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 29/7/2008



Organic phase composition: 49 mM N-DPP + 0.5 M 2-bromodecanoic acid in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each)
in 0.10 / 0.20 / 0.49 M HNO_3

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} \leq 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Screening Test Results ST3.

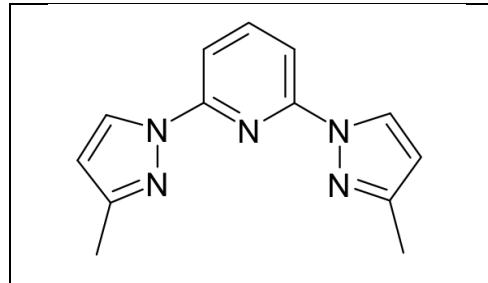
Compound name: **2,6-bis(3-methylpyrazol-1-yl)pyridine**

Acronym: 3-Me-N-DPP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 9/9/2008; 22/10/2008



Organic phase composition: 54 mM 3-Me-N-DPP in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each)
in 0.1 / 0.2 / 0.5 / 1.0 / 2.0 / 4.0 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Organic phase composition: 50 mM 3-Me-N-DPP in 1-octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.98 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Screening Test Results ST4.

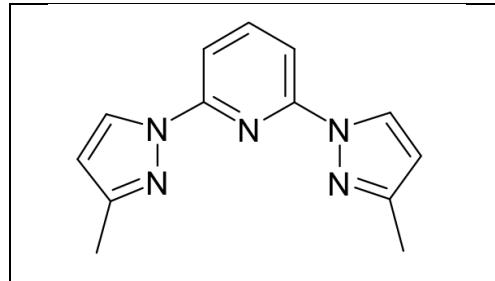
Compound name: **2,6-bis(3-methylpyrazol-1-yl)pyridine**

Acronym: 3-Me-N-DPP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 9/9/2008



Organic phase composition: 0.15 M 3-Me-N-DPP
+ 0.5 M 2-bromodecanoic acid in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each)
in 0.10 / 0.20 / 0.49 M HNO_3

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Screening Test Results ST5.

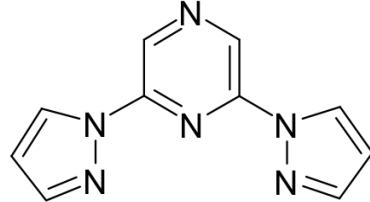
Compound name: **2,6-bis(pyrazol-1-yl)pyrazine**

Acronym: N-DPPz

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 9/9/2008



Results

Solubility in 1-octanol < 10 mM.

Solubility in kerosene < 10 mM.

Screening Test Results ST6.

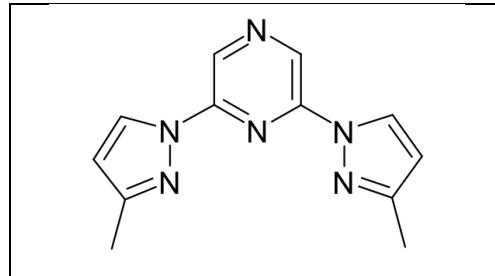
Compound name: **2,6-bis(3-methylpyrazol-1-yl)pyrazine**

Acronym: 3-Me-N-DPPz

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 18/7/2008



Organic phase composition: 10 mM 3-Me-N-DPPz in 1-octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.98 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Solubility in kerosene < 10 mM.

Screening Test Results ST7.

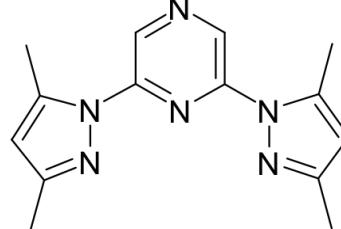
Compound name: **2,6-bis(3,5-dimethylpyrazol-1-yl)pyrazine**

Acronym: 3,5-diMe-N-DPPz

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 18/7/2008; 22/10/2008



Organic phase composition: 10 mM 3,5-diMeN-DPPz in 1-octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each)
in 0.1 / 0.2 / 0.5 / 1.0 / 2.0 / 4.0 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Am(III)}/\text{Eu(III)}}$
0.1	$< 10^{-3}$	$< 10^{-3}$	
0.2	$< 10^{-3}$	$< 10^{-3}$	
0.5	$< 10^{-3}$	$< 10^{-3}$	
1.0	$< 10^{-3}$	$< 10^{-3}$	
2.0	10^{-3}	$< 10^{-3}$	
4.0	$2 \cdot 10^{-3}$	10^{-3}	

Solubility in kerosene < 10 mM.

Screening Test Results ST8.

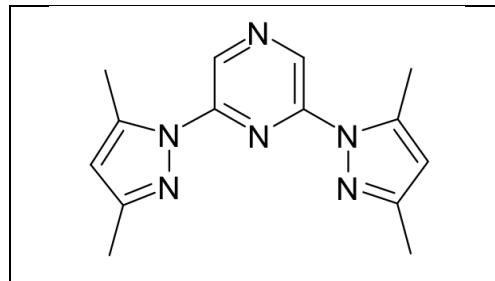
Compound name: **2,6-bis(3,5-dimethylpyrazol-1-yl)pyrazine**

Acronym: 3,5-diMe-N-DPPz

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 29/7/2008



Organic phase composition: 11 mM 3,5-diMe-N-DPPz
+ 0.5 M 2-bromodecanoic acid in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each)
in 0.10 / 0.20 / 0.49 M HNO₃

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 45 min

Results

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 300 μL samples)

Screening Test Results ST9.

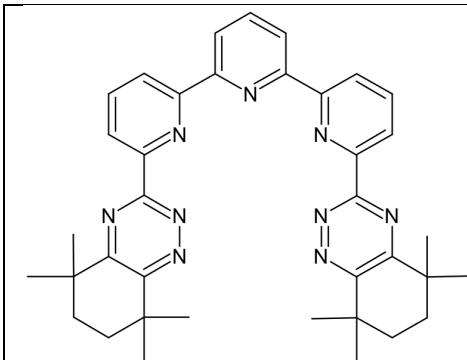
Compound name: **6,6''-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine**

Acronym: CyMe₄-BTTP

Received from: UREAD

Tested by: FZJ

Date tested: 15/10/2008



Organic phase composition: 0.01 M CyMe₄-BTTP
in 1-octanol

Aqueous phase composition: 0.01 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm

Phase volumes: 500 µL

Temperature: 22°C (temperature controlled)

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

Contacting time: 60 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.01	0.002	0.002	1.0	emulsion
0.1	0.001	0.001	0.8	emulsion
1.02	0.020	0.002	11.0	emulsion
2.06	0.039	0.003	12.0	emulsion
3.13	0.034	0.003	11.3	emulsion
4.14	0.023	0.003	6.6	

Screening Test Results ST10.

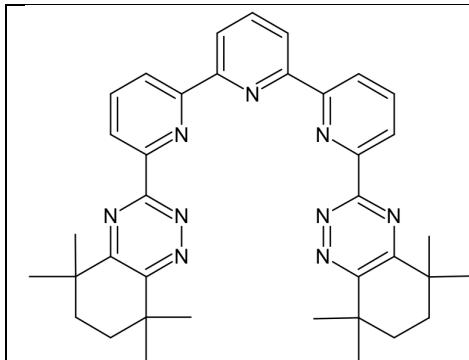
Compound name: **6,6''-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine**

Acronym: CyMe₄-BTTP

Received from: UREAD

Tested by: FZJ

Date tested: 15/10/2008



Organic phase composition: 0.01 M CyMe₄-BTTP
+ 1 M 2-bromohexanoic acid
in 1-octanol

Aqueous phase composition: 0.001 – 0.2 M HNO₃ + ²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm

Phase volumes: 500 μL

Temperature: 22°C (temperature controlled)

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

Contacting time: 60 min

Results

[HNO ₃] _{ini} [M]	D _{Am(III)}	D _{Eu(III)}	SF _{Am(III)/Eu(III)}	Comments
0.001	20.859	1.174	17.8	
0.005	3.348	0.177	18.9	
0.01	0.649	0.032	20.5	
0.05	0.015	0.002	7.3	
0.10	0.008	0.002	3.5	small precipitation
0.20	0.005	0.002	3.2	small precipitation

Screening Test Results ST11.

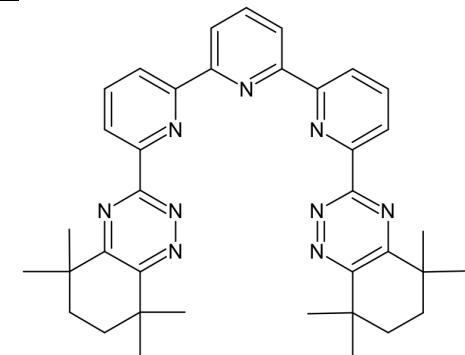
Compound name: **6,6''-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine**

Acronym: CyMe₄-BTTP

Received from: UREAD

Tested by: CTU

Date tested: 5/11/2008



Organic phase composition: 0.01 M CyMe₄-BTTP
in 1-octanol

Aqueous phase composition: 0.1 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu

Phase volumes:

Temperature:

Shaking device:

Contacting time:

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.1	0.0003	0.0002	–	
0.5	0.0058	< 0.0002	–	
1	0.0235	0.0009	26	
2	0.0307	0.001	31	
4	0.024	0.0017	14	

Screening Test Results ST12.

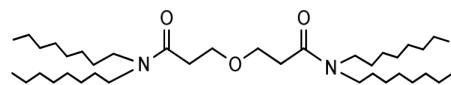
Compound name: **3,3'-oxybis(N,N-dioctylpropanamide)**

Acronym: TWE-1

Received from: TWENTE

Tested by: FZJ

Date tested: 20/10/2008



Organic phase composition: 0.1M TWE-1 in TPH (K319 - K324 + K331)

Aqueous phase composition: 0.001 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C

Shaking device: Heidolph REAX 2000; 2400 rpm

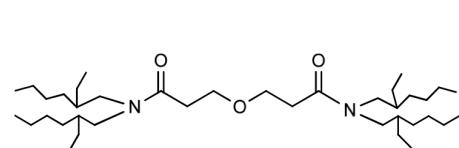
Contacting time: 15 min

Results

$D_{Am(III)} < 2 \cdot 10^{-3}$; $D_{Eu(III)} < 3 \cdot 10^{-3}$

Screening Test Results ST13.

Compound name:	3,3'-oxybis(N,N-bis(2-ethylhexyl)-propanamide)
Acronym:	TWE-2
Received from:	TWENTE
Tested by:	FZJ
Date tested:	20/10/2008



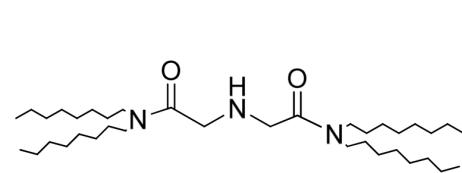
Organic phase composition: 0.1M TWE-2 in TPH (K325 - K330 + K332)
 Aqueous phase composition: 0.001 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$$D_{Am(III)} < 10^{-3}; D_{Eu(III)} < 10^{-3}$$

Screening Test Results ST14.

Compound name:	2,2'-azanediylbis(N,N-diethylacetamide)
Acronym:	TWE-6
Received from:	TWENTE
Tested by:	FZJ
Date tested:	24/10/2008



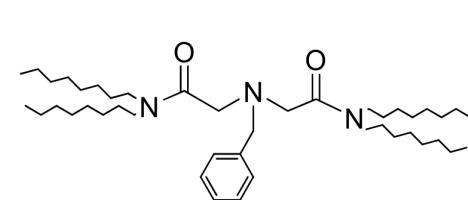
Organic phase composition: 0.1M TWE-6 in TPH (K363 - K368)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$D_{Am(III)} \leq 0.06$; $D_{Eu(III)} \leq 0.04$

Screening Test Results ST15.

Compound name:	2,2'-(benzylazanediyl)bis(N,N-diethylacetamide)
Acronym:	TWE-7
Received from:	TWENTE
Tested by:	FZJ
Date tested:	24/10/2008



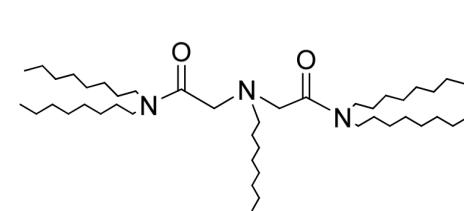
Organic phase composition: 0.1M TWE-7 in TPH (K357 - K362)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$D_{Am(III)} < 0.08$; $D_{Eu(III)} \leq 0.012$

Screening Test Results ST16.

Compound name:	2,2'-(octylazanediyl)bis(N,N-dioctylacetamide)
Acronym:	TWE-8
Received from:	TWENTE
Tested by:	FZJ
Date tested:	21/10/2008



Organic phase composition: 0.1M TWE-8 in TPH (K333 - K338)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$D_{Am(III)} < 0.08$; $D_{Eu(III)} < 0.06$

Screening Test Results ST17.

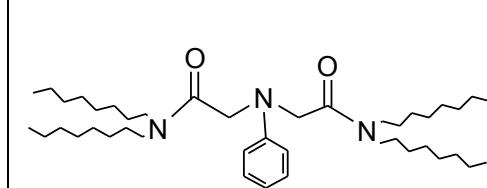
Compound name: **2,2'-(phenylazanediyl)bis(N,N-dioctylacetamide)**

Acronym: TWE-9

Received from: TWENTE

Tested by: FZJ

Date tested: 23/10/2008



Organic phase composition: 0.1M TWE-9 in TPH (K351 - K356)

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C

Shaking device: Heidolph REAX 2000; 2400 rpm

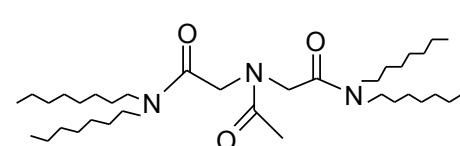
Contacting time: 15 min

Results

$D_{Am(III)} < 0.01$; $D_{Eu(III)} < 0.01$

Screening Test Results ST18.

Compound name:	2-(N-(2-(dioctylamino)-2-oxoethyl)acetamido)-N,N-dioctylacetamide
Acronym:	TWE-10
Received from:	TWENTE
Tested by:	FZJ
Date tested:	23/10/2008



Organic phase composition: 0.1M TWE-10 in TPH (K345 - K350)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$$D_{Am(III)} \leq 0.01; D_{Eu(III)} \leq 4 \cdot 10^{-3}$$

Screening Test Results ST19.

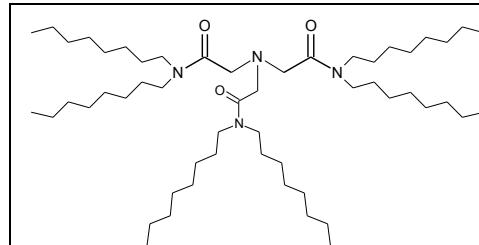
Compound name: **2,2',2''-nitrilotris(N,N-dioctylacetamide)**

Acronym: TWE-11

Received from: TWENTE

Tested by: FZJ

Date tested: 22/10/2008



Organic phase composition: 0.1M TWE-11 in TPH (K339 - K344)

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C

Shaking device: Heidolph REAX 2000; 2400 rpm

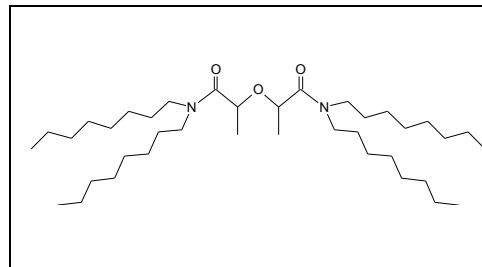
Contacting time: 15 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.0101	49.933	5.933	8.4	
0.1004	11.520	1.512	7.6	
1.0180	0.142	0.028	5.1	
2.0645	0.094	0.024	3.9	
3.1290	0.073	0.022	3.3	
4.1390	0.068	0.025	2.8	

Screening Test Results ST20.

Compound name:	2,2'-oxybis(N,N-diethylpropanamide)
Acronym:	TWE-14
Received from:	TWENTE
Tested by:	FZJ
Date tested:	12/01/2009



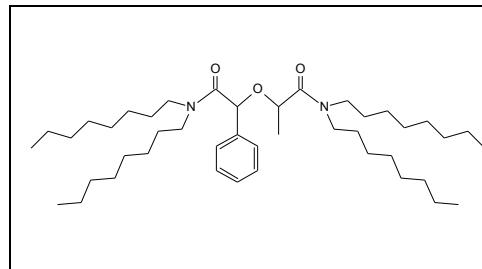
Organic phase composition: 0.1M TWE-14 in TPH (K460 – K465)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Eu(III)/Am(III)}$	Comments
0.0113	0.000	0.001	3.2	
0.1092	0.000	0.000	4.4	
1.0433	0.001	0.002	2.2	
2.1150	0.029	0.035	1.2	
3.1290	1.105	2.126	1.9	
4.0133	7.409	16.270	2.2	

Screening Test Results ST21.

Compound name:	2-(2-(dioctylamino)-2-oxo-1-phenylethoxy)-N,N-dioctylpropanamide)
Acronym:	TWE-15
Received from:	TWENTE
Tested by:	FZJ
Date tested:	14/01/2009



Organic phase composition: 0.1M TWE-15 in TPH (M304 - M309)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.0113	0.001	0.001	1.0	
0.1092	0.000	0.000	2.7	
1.0433	0.002	0.002	1.5	
2.1150	0.067	0.036	1.8	
3.1290	0.707	0.437	1.6	
4.0133	3.935	3.027	1.3	

Screening Test Results ST22.

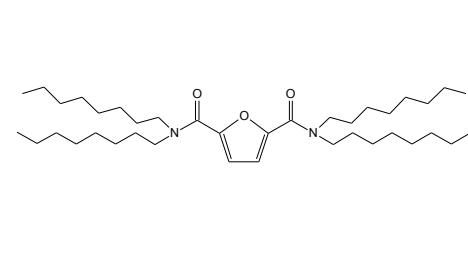
Compound name: **N,N,N',N'-tetraoctylfuran-2,5-dicarboxamide**

Acronym: TWE-16

Received from: TWENTE

Tested by: FZJ

Date tested: 20/01/2009



Organic phase composition: 0.1M TWE-16 in TPH (M316 – M321)

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C

Shaking device: Heidolph REAX 2000; 2400 rpm

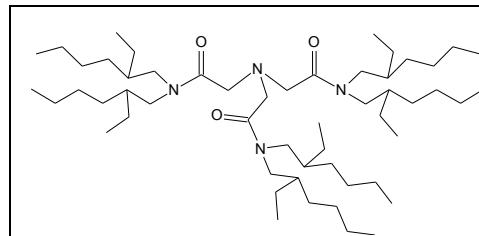
Contacting time: 15 min

Results

$D_{Am(III)} < 10^{-3}$; $D_{Eu(III)} < 10^{-3}$

Screening Test Results ST23.

Compound name:	2,2',2''-nitrilotris(N,N-bis(2-ethylhexyl)acetamide)
Acronym:	TWE-17
Received from:	TWENTE
Tested by:	FZJ
Date tested:	19/01/2009



Organic phase composition: 0.1M TWE-17 in TPH (K474 – K479)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm)
 Phase volumes: 400 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.0113	3.156	0.268	11.8	
0.1092	0.394	0.063	6.2	
1.0433	0.137	0.044	3.1	
2.1150	0.131	0.048	2.7	
3.1290	0.114	0.043	2.6	
4.0133	0.096	0.043	2.2	

Screening Test Results ST24.

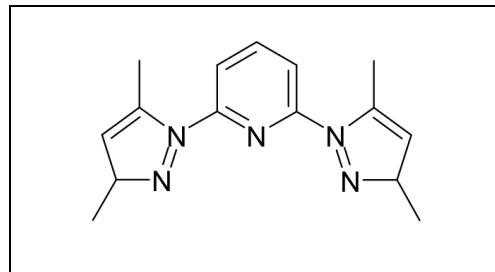
Compound name: **2,6-bis(3,5-dimethylpyrazol-1-yl)pyridine**

Acronym: 3,5-diMe-N-DPP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 10/11/2008



Organic phase composition: 0.15 M 3,5-diMe-N-DPP in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each)
in 0.1 / 0.2 / 0.5 / 1.0 / 2.0 / 4.0 M HNO_3

Phase volumes: 500 μL each

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 60 min

Results

Solubility approx. 0.18 M in kerosene

$D_{\text{Am(III)}} < 10^{-3}$; $D_{\text{Eu(III)}} < 10^{-3}$ (determined by gamma counting, 400 μL samples)

Screening Test Results ST25.

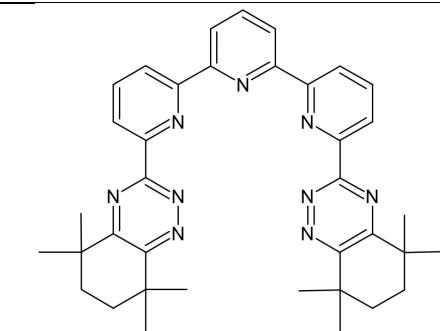
Compound name: **6,6''-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine**

Acronym: CyMe₄-BTTP

Received from: UREAD

Tested by: FZJ

Date tested: 4/11/2008



Organic phase composition: 0.01 M CyMe₄-BTTP
0.25M DMDOHEMA
in 1-octanol

Aqueous phase composition: 0.01 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm

Phase volumes: 500 μL

Temperature: 22°C (temperature controlled)

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

Contacting time: 60 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.01	0.003	0.003	1.0	
0.1	0.003	0.002	2.2	
1.02	0.095	0.009	10.8	
2.06	0.194	0.024	8.0	
3.13	0.213	0.039	5.4	
4.14	0.206	0.062	3.3	

Screening Test Results ST26.

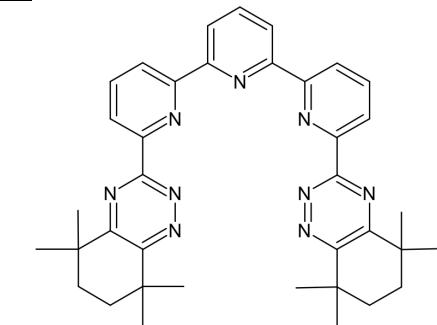
Compound name: **6,6''-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine**

Acronym: CyMe₄-BTTP

Received from: UREAD

Tested by: FZK-INE

Date tested: 18/11/2008



Organic phase composition: 0.01 M CyMe₄-BTTP
0.25M DMDOHEMA
+ 13% vol. 1-octanol in TPH

Aqueous phase composition: 0.1 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu

Phase volumes: 500 μL

Temperature: 21°C

Shaking device: Orbital shaker, 500/min

Contacting time: 120 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.1	$4 \cdot 10^{-4}$	–	–	bad phase separation
0.2	$8 \cdot 10^{-4}$	$4 \cdot 10^{-4}$	2	bad phase separation
0.5	$4.3 \cdot 10^{-3}$	10^{-3}	4	bad phase separation
1.0	0.027	$4.9 \cdot 10^{-3}$	5.4	
2.0	0.21	0.033	6.3	aq. phase slightly yellow
4.0	0.58	0.29	2.0	aq. phase yellow, org. phase colourless

Some 1-octanol had to be added due to solubility. Although some extraction is observed, this is due to DMDOHEMA. At elevated [HNO₃] extractant partitions to aqueous phase.

Screening Test Results ST27.

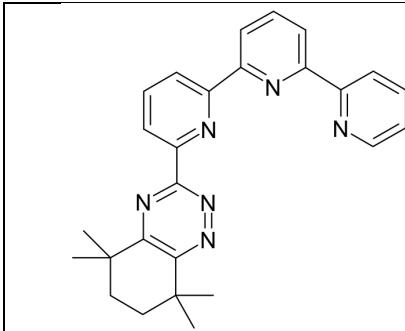
Compound name: **6-(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine**

Acronym: CyMe₄-hemi-BTBP

Received from: UREAD

Tested by: FZJ

Date tested: 1/12/2008



Organic phase composition: 0.01M CyMe₄-hemi-BTBP
in 1-octanol

Aqueous phase composition: 0.01 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm

Phase volumes: 500 µL

Temperature: 22°C (temperature controlled)

Shaking device: Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

Results

$D_{Am(III)}, D_{Eu(III)} \leq 2 \cdot 10^{-3}$

Screening Test Results ST28.

Compound name:	6-(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2':6',2''-terpyridine
Acronym:	CyMe ₄ -hemi-BTBP
Received from:	UREAD
Tested by:	FZJ
Date tested:	1/12/2008

Organic phase composition: 0.01M CyMe₄-hemi-BTBP
+ 1 M 2-bromohexanoic acid
in 1-octanol

Aqueous phase composition: 0.001 – 0.2 M HNO₃ + ²⁴¹Am, ¹⁵²Eu, ²⁵²Cf, ²⁴⁴Cm

Phase volumes: 500 µL

Temperature: 22°C (temperature controlled)

Shaking device: Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

Results

[HNO ₃] _{ini} [M]	D _{Am(III)}	D _{Eu(III)}	SF _{Am(III)/Eu(III)}	Comments
0.001	1.343	0.089	15	
0.005	0.497	0.032	15	
0.01	0.145	0.010	15	
0.05	0.0109	0.0016	7	
0.1	0.0054	0.0002	27	
0.2	0.0021	0.0010	2	

Screening Test Results ST29.

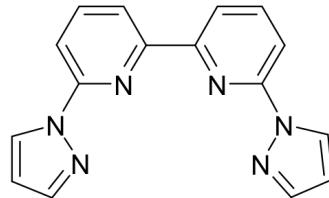
Compound name: **6,6'-bis(pyrazol-1-yl)-2,2'-bipyridine**

Acronym: N-DPBP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 19/1/2009



Results

Compound is not soluble in kerosene or 1-octanol at 10 mM.

Screening Test Results ST30.

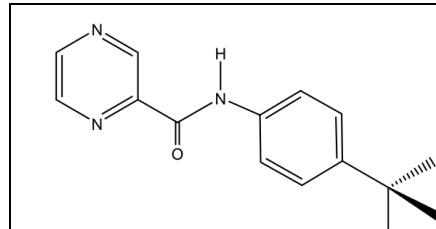
Compound name: **N-(4-tert-butylphenyl)pyrazine-2-carboxamide**

Acronym: **TBAPYR**

Received from: **UNIPR**

Tested by: **POLIMI**

Date tested: **23/01/2009**



Organic phase composition: **25 mM TBAPYR in 1-Octanol**

Aqueous phase composition: **$^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 3.82 M HNO_3**

Phase volumes: **500 μL each**

Temperature: **$23 \pm 1^\circ\text{C}$**

Shaking device: **orbital shaker, 1000/min**

Contacting time: **60 min**

Results

$$D_{\text{Am(III)}} = 0.0020, D_{\text{Eu(III)}} = 0.0016, SF = 1.21$$

- Insoluble in kerosene at [TBAPYR] ≥ 25 mM; insoluble in 1-Octanol at [TBAPYR] ≥ 100 mM; ; solubility not tested in 1-Octanol in the range 50 mM $<$ [TBAPYR] $<$ 100 mM; soluble in 1-Octanol at [TBAPYR] ≤ 50 mM
- No visible third phase was present, but the volume of organic phase increased by 10-20%

Screening Test Results ST31.

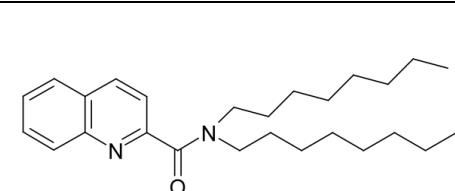
Compound name: **N,N-Dioctyl-Quinoline-2-carboxamide**

Acronym: 2DOQA

Received from: POLIMI

Tested by: POLIMI

Date tested: 16/12/2008



Organic phase composition: 100 mM 2DOQA in 1-Octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each)
in 1 M HNO_3 + 4 M LiNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$D_{\text{Am(III)}} = 0.009$, $D_{\text{Eu(III)}} = 0.008$, $SF = 1.1$

- The aqueous phase was orange-coloured after the extraction.

Screening Test Results ST32.

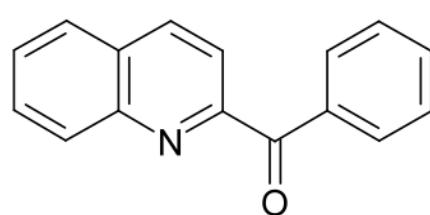
Compound name: **Phenyl(quinolin-2-yl)methanone**

Acronym: 2PQM

Received from: POLIMI

Tested by: POLIMI

Date tested: 27/01/2009



Organic phase composition: 10 mM 2PQM in kerosene, 1-octanol, or 2-NPHE

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each)
in 1 M HNO_3 or 3.82 M HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$D_{\text{Am(III)}} < 0.001$, $D_{\text{Eu(III)}} < 0.001$, SF = -

Screening Test Results ST33.

Compound name:	N,N'-bis(4-tert-butylphenyl)-p-octyloxy picolinamide
Acronym:	CHELI1
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	23/01/2009

Organic phase composition:	5 mM CHELI1 in 1-Octanol
Aqueous phase composition:	$^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 3.82 M HNO ₃
Phase volumes:	500 μL each
Temperature:	23±1°C
Shaking device:	orbital shaker, 1000/min
Contacting time:	60 min

Results

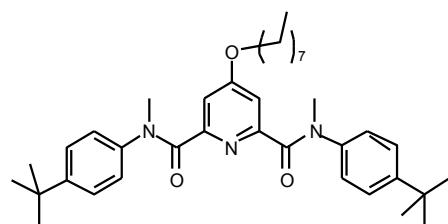
Solubility: strongly insoluble at $[CHELI1] \geq 25 \text{ mM}$, solubility not tested in the range $5 \text{ mM} < [CHELI1] < 25 \text{ mM}$

Distribution ratios: $D_{Am(III)} = 0.0021$, $D_{Eu(III)} = 0.0017$, $SF = 1.24$

- No visible third phase was present, but the volume of organic phase increased by 10-20%

Screening Test Results ST34.

Compound name:	N,N'-dimethyl-N,N'-bis(4-tert-butylphenyl)-p-octyloxy picolinamide
Acronym:	CHELI2
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	30/10/2008



Organic phase composition: 100 mM CHELI2 in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$$D_{\text{Am(III)}} = 0.0064, D_{\text{Eu(III)}} = 0.0014, SF = 4.59$$

- A small yellow-orange precipitate was detected after extraction.

Organic phase composition: 100 mM CHELI2 in 1-Octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M or 3.82 M HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

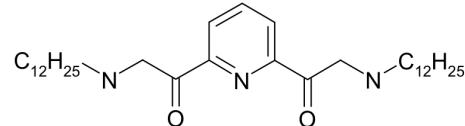
Results

$$1 \text{ M } \text{HNO}_3: D_{\text{Am(III)}} = 0.0336, D_{\text{Eu(III)}} = 0.0126, SF = 2.67$$

$$3.82 \text{ M } \text{HNO}_3: D_{\text{Am(III)}} = 0.0639, D_{\text{Eu(III)}} = 0.0293, SF = 2.18$$

Screening Test Results ST35.

Compound name:	N,N'bis(dodecyl)pyridine-2,6-carboxamide
Acronym:	NDIPIIC
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	05/11/2008



Organic phase composition: 100 mM NDDIPIIC in 1-Octanol
 Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M HNO_3
 Phase volumes: 500 μL each
 Temperature: $23 \pm 1^\circ\text{C}$
 Shaking device: orbital shaker, 1000/min
 Contacting time: 60 min

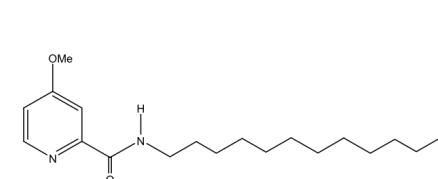
Results

$$D_{\text{Am(III)}} < 0.001, D_{\text{Eu(III)}} < 0.001$$

- Insoluble in kerosene at $[\text{NDIPIIC}] \geq 50 \text{ mM}$

Screening Test Results ST36.

Compound name:	N-dodecyl-4-methoxypyridine-2-carboxamide
Acronym:	NDMPIC
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	31/10/2008



Organic phase composition: 100 mM NDMPIC in kerosene
 Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M HNO_3
 Phase volumes: 500 μL each
 Temperature: $23 \pm 1^\circ\text{C}$
 Shaking device: orbital shaker, 1000/min
 Contacting time: 60 min

Results

$D_{\text{Am(III)}} = \text{n.d.}$, $D_{\text{Eu(III)}} = \text{n.d.}$

- The two phases are impossible to separate, even after repeated centrifugation.

Organic phase composition: 100 mM NDMPIC in 1-Octanol
 Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 3.82 M HNO_3
 Phase volumes: 500 μL each
 Temperature: $23 \pm 1^\circ\text{C}$
 Shaking device: orbital shaker, 1000/min
 Contacting time: 60 min

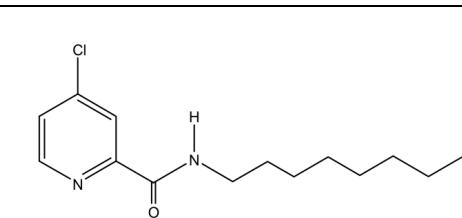
Results

$D_{\text{Am(III)}} = 0.003$, $D_{\text{Eu(III)}} = 0.0027$, $SF = 1.19$

- No visible third phase was present, but the volume of organic phase increased by 10-20%

Screening Test Results ST37.

Compound name:	4-chloro-N-octylpyridine-2-carboxamide
Acronym:	NOCPIC
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	05/11/2008



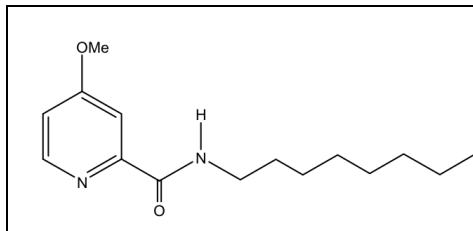
Organic phase composition: 100 mM NOCPIC in 1-Octanol
 Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M HNO_3
 Phase volumes: 500 μL each
 Temperature: $23 \pm 1^\circ\text{C}$
 Shaking device: orbital shaker, 1000/min
 Contacting time: 60 min

Results

$D_{\text{Am(III)}} < 0.001$, $D_{\text{Eu(III)}} < 0.001$

Screening Test Results ST38.

Compound name:	4-methoxy-N-octylpyridine-2-carboxamide
Acronym:	NOMPIC
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	31/10/2008



Organic phase composition:	100 mM NOMPIC in kerosene
Aqueous phase composition:	$^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M HNO_3
Phase volumes:	500 μL each
Temperature:	23 \pm 1°C
Shaking device:	orbital shaker, 1000/min
Contacting time:	60 min

Results

$$D_{\text{Am(III)}} < 0.001, D_{\text{Eu(III)}} < 0.001$$

- Small yellow precipitate after extraction.

Organic phase composition:	100 mM NOMPIC in 1-Octanol
Aqueous phase composition:	$^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 3.82 M HNO_3
Phase volumes:	500 μL each
Temperature:	23 \pm 1°C
Shaking device:	orbital shaker, 1000/min
Contacting time:	60 min

Results

$$D_{\text{Am(III)}} = 0.0032, D_{\text{Eu(III)}} = 0.0027, SF = 1.17$$

- No visible third phase was present, but the volume of organic phase increased by 10-20%

Screening Test Results ST39.

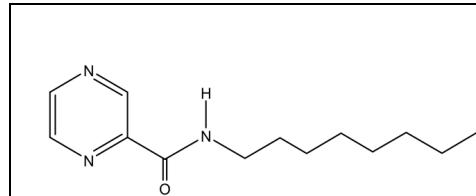
Compound name: **N-octylpyrazine-2-carboxamide**

Acronym: OPYR

Received from: UNIPR

Tested by: POLIMI

Date tested: 31/10/2008



Organic phase composition: 100 mM OPYR in 1-Octanol

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in 1 M HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$D_{\text{Am(III)}} < 0.001$, $D_{\text{Eu(III)}} < 0.001$

- Insoluble in kerosene at $[\text{OPYR}] \geq 50 \text{ mM}$

Screening Test Results ST40.

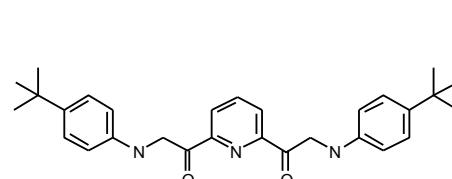
Compound name: **N,N'-bis(4-*tert*-butylphenyl)pyridine-2,6-carboxamide**

Acronym: TBADIPIC

Received from: UNIPR

Tested by: POLIMI

Date tested: 23/01/2009



Organic phase composition: 25 mM TBADIPIC in 1-Octanol

Aqueous phase composition: $^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (9 kBq/mL each) in 3.82 M HNO₃

Phase volumes: 500 μL each

Temperature: 23±1°C

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$$D_{\text{Am}(\text{III})} = 0.0019, D_{\text{Eu}(\text{III})} = 0.0015, SF = 1.26$$

- Insoluble in kerosene at [TBADIPIC] >= 50 mM; insoluble in 1-Octanol at [TBADIPIC] >= 100 mM; solubility not tested in 1-Octanol in the range 50 mM < [TBADIPIC] < 100mM; soluble in 1-Octanol at [TBADIPIC] <= 50 mM
- No visible third phase was present, but the volume of organic phase increased by 10-20%

Screening Test Results ST41.

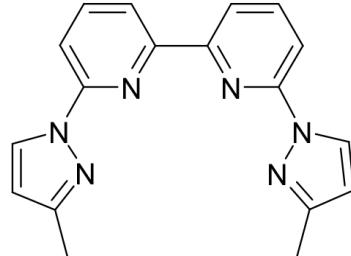
Compound name: **6,6'-bis(3-methylpyrazol-1-yl)-2,2'-bipyridine**

Acronym: 3-Me-N-DPBP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 23/1/2009



Results

Compound is not soluble in kerosene or 1-octanol at 10 mM.

Screening Test Results ST42.

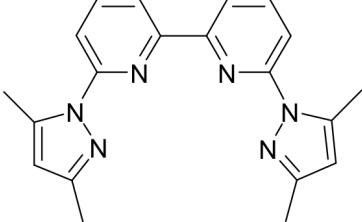
Compound name: **6,6'-bis(3,5-dimethylpyrazol-1-yl)-2,2'-bipyridine**

Acronym: 3,5-diMe-N-DPBP

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 23/1/2009



Results

Compound is not soluble in kerosene or 1-octanol at 10 mM.

Screening Test Results ST43.

Compound name:	2,9-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-1,10-phenanthroline
Acronym:	CyMe ₄ -BTPhen
Received from:	UREAD
Tested by:	FZJ
Date tested:	22/4/2009

Organic phase composition: 0.01 M CyMe₄-BTPhen in 1-octanol
 Aqueous phase composition: 0.001 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu, ²⁵²Cf
 Phase volumes: 500 μL
 Temperature: 22°C (temperature controlled)
 Shaking device: Vibrax Orbital Shaker Model VXR, 2200rpm
 Contacting time: 60 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
pH = 3.05	17	0.25	68	bad phase separation
0.0113	43	0.29	146	bad phase separation
0.1092	457	2.5	182	bad phase separation
1.009	1127	4.0	283	bad phase separation
2.00	891	4.7	189	bad phase separation
2.926	1157	4.6	252	
4.013	1314	3.3	400	

Screening Test Results ST44.

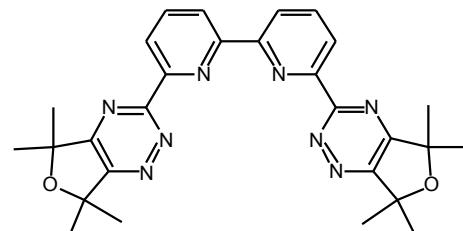
Compound name: **6,6'-bis(5,5,7,7-tetramethyl-5,7-dihydrofuro[3,4-*e*]-1,2,4-triazin-3-yl)-2,2'-bipyridine**

Acronym: Cy₅-O-Me₄-BTBP

Received from: UREAD

Tested by: FZK-INE

Date tested: 23/6/2009



Results

Compound is not soluble in kerosene or 1-octanol at 10 mM (solubility in 1-octanol < 3 mM).

Screening Test Results ST45.

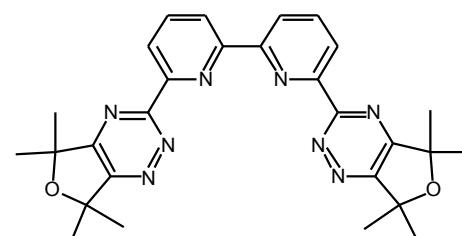
Compound name: **6,6'-bis(5,5,7,7-tetramethyl-5,7-dihydrofuro[3,4-e]-1,2,4-triazin-3-yl)-2,2'-bipyridine**

Acronym: Cy₅-O-Me₄-BTBP

Received from: UREAD

Tested by: CTU

Date tested: 8/7/2009



Organic phase composition: 5 mM Cy₅O-Me₄-BTBP in **cyclohexanone**

Aqueous phase composition: 0.1 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu

Phase volumes: 1000 µL

Temperature: approx. 25°C

Shaking device: GFL 3005 orbital shaker (Germany); 250 /min

Contacting time: 6 h

Results

Solubility: cyclohexanone, solubility 5 mM

Distribution ratios:

c(HNO ₃)	D(Am)		R(%)	D(Eu)		R(%)	SF(Am/Eu)
0,1	0,003	+/- 0,001	98,2	< 0,003		99,7	> 2
0,5	0,003	+/- 0,001	97,0	< 0,003		100,7	> 2
1	0,013	+/- 0,001	96,3	0,003 +/- 0,001		95,6	4,3 +/- 1,0
2	0,064	+/- 0,003	99,2	0,011 +/- 0,001		96,8	5,8 +/- 0,8
4	0,12	+/- 0,01	89,3	0,056 +/- 0,003		90,5	2,2 +/- 0,2

The errors given are 1 sigma and they include counting statistics and pipetting, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only.

Screening Test Results ST46.

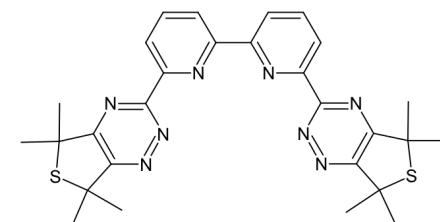
Compound name: **6,6'-bis(5,5,7,7-tetramethyl-5,7-dihydrothienol[3,4-e]-1,2,4-triazin-3-yl)-2,2'-bipyridine**

Acronym: Cy₅S-Me₄-BTBP

Received from: UREAD

Tested by: CTU

Date tested: 17/6/2009



Organic phase composition: 5 mM Cy₅S-Me₄-BTBP in **1-octanol**

Aqueous phase composition: 0.01 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu

Phase volumes: 1000 µL

Temperature: approx. 25°C

Shaking device: GFL 3005 orbital shaker (Germany); 250 /min

Contacting time: 6 h

Results

Solubility: 1-octanol, solubility 5 mM < solubility < 10 mM

Distribution ratios:

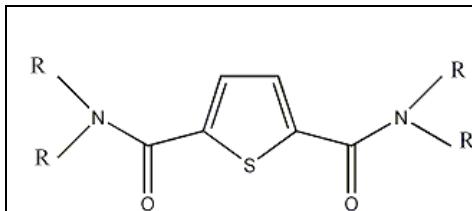
c(HNO ₃)	D(Am)	R(%)	D(Eu)	R(%)	SF(Am/Eu)
0,01	< 0,004	100,3	< 0,003	100,6	
0,1	< 0,004	100,7	< 0,003	101,7	
0,5	0,003 +/- 0,002	105,7	< 0,003	100,3	> 2
1	0,026 +/- 0,002	100,2	< 0,003	97,1	> 16
2	0,078 +/- 0,004	106,5	< 0,003	104,9	> 46
4	0,46 +/- 0,01	108,6	0,011 +/- 0,001	108,5	41,5 +/- 5,2

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.

Screening Test Results ST47.

Compound name:	<i>N,N,N',N'-tetraoctyl thiophene-2,5-carboxamide</i>
Acronym:	T8-THP-CAM
Received from:	POLIMI
Tested by:	POLIMI
Date tested:	19/06/2009



Organic phase composition: (*cf. below*)

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

Organic phase composition: 50 mM T8-THP-CAM in 1-octanol

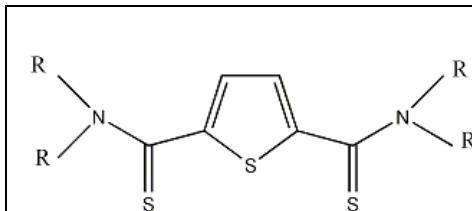
$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Am(III)/Eu(III)}}$	Comments
1.0	< 0.002	< 0.002	—	
3.82	< 0.002	< 0.002	—	

Organic phase composition: 50 mM T8-THP-CAM in kerosene

$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Am(III)/Eu(III)}}$	Comments
1.0	< 0.001	< 0.001	—	
3.82	< 0.001	< 0.001	—	

Screening Test Results ST48.

Compound name:	<i>N,N,N',N'-tetraoctyl thiophene-2,5-carbothioamide</i>
Acronym:	T8-THP-TAM
Received from:	POLIMI
Tested by:	POLIMI
Date tested:	08/07/2009



Organic phase composition: (*cf. below*)

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

Organic phase composition: 50 mM T8-THP-TAM in 1-octanol

$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Am(III)/Eu(III)}}$	Comments
1.0	< 0.002	< 0.002	—	
3.82	0.0014	0.0015	1	

Organic phase composition: 50 mM T8-THP-TAM in kerosene

$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Am(III)/Eu(III)}}$	Comments
1.0	< 0.001	< 0.001	—	
3.82	< 0.001	< 0.001	—	

Screening Test Results ST49.

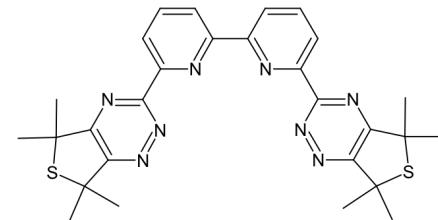
Compound name: **6,6'-bis(5,5,7,7-tetramethyl-5,7-dihydrothienol[3,4-e]-1,2,4-triazin-3-yl)-2,2'-bipyridine**

Acronym: Cy₅-S-Me₄-BTBP

Received from: UREAD

Tested by: CTU

Date tested: 9/7/2009



Organic phase composition: 5 mM Cy₅S-Me₄-BTBP in **cyclohexanone**

Aqueous phase composition: 0.1 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu

Phase volumes: 500 µL

Temperature: approx. 25°C

Shaking device: GFL 3005 orbital shaker (Germany); 250 /min

Contacting time: 6 h

Results

Solubility: cyclohexanone, solubility 14 mM

Distribution ratios:

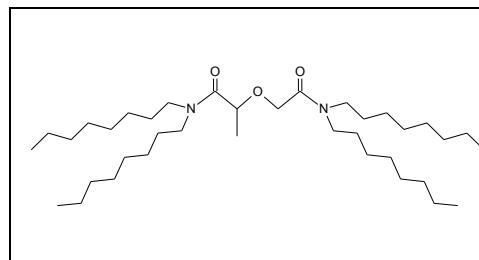
c(HNO ₃)	D(Am)	R(%)	D(Eu)	R(%)	SF(Am/Eu)
0,1	0,002 +/- 0,001	95,9	< 0,003	96,4	> 1
0,5	0,005 +/- 0,001	100,6	0,002 +/- 0,001	98,2	2,5 +/- 0,9
1	0,023 +/- 0,002	100,0	0,009 +/- 0,001	101,1	2,6 +/- 0,4
2	0,24 +/- 0,01	101,8	0,011 +/- 0,001	103,8	22,1 +/- 2,6
4	0,72 +/- 0,03	100,9	0,056 +/- 0,003	106,6	12,8 +/- 0,8

The errors given are 1 sigma and they include counting statistics and pipetting, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only.

Screening Test Results ST50.

Compound name:	2-(2-(dioctylamino)-2-oxoethoxy)-N,N-dioctylpropanamide
Acronym:	TWE-21
Received from:	TWENTE
Tested by:	FZJ
Date tested:	30/07/2009



Organic phase composition: 0.1M TWE-21 in TPH
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu)
 Phase volumes: 500 µL
 Temperature: 22°C
 Shaking device: Heidolph REAX 2000; 2400 rpm
 Contacting time: 15 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(III)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.0113	0.001	0.001	0.93	
0.1092	0.003	0.003	0.88	
1.009	0.212	0.774	0.27	
1.9855	13.429	58.589	0.23	
3.0557	178.906	358.266	0.50	
4.0133	381.811	470.058	0.81	

Screening Test Results ST51.

Compound name:	2-(2-(dioctylamino)-2-oxoethoxy)-N,N-dioctyl-2-phenylacetamide
Acronym:	TWE-22
Received from:	TWENTE
Tested by:	FZJ
Date tested:	30/07/2009

Organic phase composition: 0.1M TWE-22 in TPH

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu)

Phase volumes: 500 μ L

Temperature: 22°C

Shaking device: Heidolph REAX 2000; 2400 rpm

Contacting time: 15 min

Results

$[HNO_3]_{ini}$ [M]	$D_{Am(II)}$	$D_{Eu(III)}$	$SF_{Am(III)/Eu(III)}$	Comments
0.0113	0.003	0.003	0.9	
0.1092	0.000	0.000	1.5	
1.009	0.002	0.002	1.0	
1.9855	0.111	0.193	0.6	
3.0557	1.955	4.328	0.5	
4.0133	12.050	29.740	0.4	

Screening Test Results ST52.

Compound name:	6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine
Acronym:	CyMe ₄ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	12/8/2009

Organic phase composition: 5 mM CyMe₄-BTBP in **cyclohexanone**

Aqueous phase composition: 0.1 – 4 M HNO₃ + ²⁴¹Am, ¹⁵²Eu

Phase volumes: 500 µL

Temperature: approx. 25°C

Shaking device: GFL 3005 orbital shaker (Germany); 250 /min

Contacting time: 6 h

Results

Distribution ratios:

c(HNO ₃)	D(Am)		R(%)	D(Eu)		R(%)	SF(Am/Eu)		
	D _{Am}	D _{Eu}		D _{Am}	D _{Eu}		D _{Am}	D _{Eu}	SF _{Am/Eu}
0,1	0,101	+/- 0,004	97,7	0,009	+/- 0,001	100,5	11,2	+/- 1,4	
0,5	1,146	+/- 0,027	97,8	0,016	+/- 0,001	98,5	71,6	+/- 6,8	
1	4,846	+/- 0,168	102,7	0,039	+/- 0,002	114,7	124,3	+/- 7,4	
2	12,163	+/- 0,655	97,6	0,109	+/- 0,004	101,6	111,6	+/- 7,1	
4	9,311	+/- 0,529	90,3	0,136	+/- 0,004	108,8	68,5	+/- 4,4	

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.

Screening Test Results ST53.

Compound names:	2,6-bis(pyrazol-1-yl)pyridine, 2,6-bis(pyrazol-1-yl)pyrazine, 6,6'-bis(pyrazol-1-yl)-2,2'-bipyridine	
Acronyms:	N-DPP, N-DPPz, N-DPBP	
Received from:	CSIC (via INE)	
Tested by:	ICHTJ	
Date tested:	20/08/2009	

Organic phase composition: 0.2 M TODGA + 5 % vol. 1-octanol in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ in 0.5 M NH_4NO_3 (pH 2,2)

Phase volumes: 800 μL each

Temperature: 24 °C

Shaking device: Vortex TK3S (Kartell S. p. A.), 25 Hz

Contacting time: 20–40 min plateau (7–120 min studied)

Distribution ratios a) without hydrophilic complexing agent

$\text{pH}_{eq} = 2,2$ $D_{\text{Am(III)}} = 13$ (20–40 min), $D_{\text{Eu(III)}} = 90$ (20–40 min)

b) with hydrophilic complexing agent added

not done because of low solubility of the complexing agents

Solubility N-DPP in water (saturated aqueous solution) 3.2×10^{-5} M

N-DPPz in water (saturated aqueous solution) 7.9×10^{-5} M

N-DPBP in water (saturated aqueous solution) $< 10^{-6}$ M

N-DPPz in 0.5 M HNO_3 (saturated solution) 8.5×10^{-5} M

Conclusion: Because solubility of the studied three complexing agents in water and in 0.5 M HNO_3 (the aqueous phase for i-SANEX) is very low (see above), none of the following compounds: N-DPP, N-DPPz, and N-DPBP is sufficiently hydrophilic, therefore they can not be considered promising extractants for back extraction of Am(III) in the *i*-SANEX process.

Screening Test Results ST54.

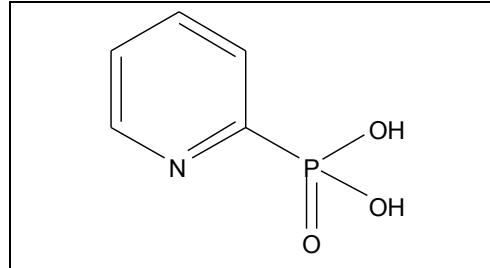
Compound name: **Pyridin-2-yl-phosphonic acid**

Acronym: PPA

Received from: CHALMERS

Tested by: CHALMERS

Date tested: 26/08/2009



Organic phase composition: 0.20 M TODGA + 5 % vol. 1-octanol in kerosene (solvent 70)

Aqueous phase composition: 0.50 M NH₄NO₃ (addition of 1M HNO₃ was made to the aq phase without hydrophilic complexing agent to lower the pH)

Phase volumes: 500 μL

Temperature: 21°C (temperature controlled)

Shaking device: modified “IKA® VIBRAX VXR basic”, 1500rpm

Contacting time: 90 min

Results

Solubility > 12 g/L

Distribution ratios
 a) without PPA
 $pH_{eq} = 1.9, D_{Am(III)} = 30, D_{Eu(III)} = 220$
 b) with 0.07 mol/L PPA added
 $pH_{eq} = 1.6, D_{Am(III)} = 19, D_{Eu(III)} = 110$

- A small portion of third phase was formed after contacting.

Screening Test Results ST55.

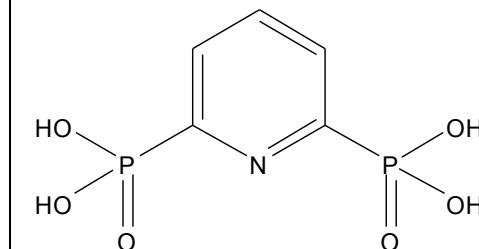
Compound name: **(6-Phosphono-pyridin-2-yl)-phosphonic acid**

Acronym: PPPA

Received from: CHALMERS

Tested by: CHALMERS

Date tested: 26/08/2009



Organic phase composition: 0.20 M TODGA + 5 % vol. 1-octanol in kerosene (solvent 70)

Aqueous phase composition: 0.50 M NH₄NO₃ (addition of 1M HNO₃ was made to the aq phase without hydrophilic complexing agent to lower the pH)

Phase volumes: 500 μL

Temperature: 21°C (temperature controlled)

Shaking device: modified “IKA® VIBRAX VXR basic”, 1500rpm

Contacting time: 90 min

Results

Solubility > 9 g/L

Distribution ratios
 a) without PPPA
 $pH_{eq} = 1.9, D_{Am(III)} = 30, D_{Eu(III)} = 220$
 b) with 0.04 mol/L PPPA added
 $pH_{eq} = 1.6, D_{Am(III)} = 0.002, D_{Eu(III)} = 0.03$

- Enhances the Eu over Am SF compared to just TODGA.

Screening Test Results ST56.

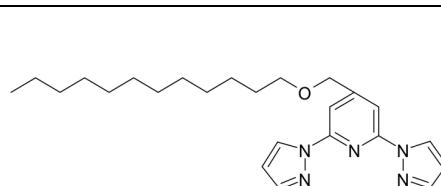
Compound name: **4-(dodecyloxymethyl)-2,6-di(1H-pyrazol-1-yl)pyridine**

Acronym: N-DP(DOM)P

Received from: CSIC-ICMAB

Tested by: FZK-INE

Date tested: 22/09/2009 – 13/10/2009



Phase volumes: 500 µL

Temperature: 20 °C (temperature controlled)

Shaking device: Orbital shaker, 2500/min

Contacting time: 20 min

Results

Organic phase composition: **0.02 M** N-DP(DOM)P in **kerosene**

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.1–4.0 M HNO₃

→ $D_{\text{Am(III)}} , D_{\text{Eu(III)}} < 3 \cdot 10^{-3}$ (determined by gamma counting, 300 µL samples)

Organic phase composition: **0.2 M** N-DP(DOM)P in **kerosene**

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 1.0 / 4.0 M HNO₃

→ $D_{\text{Am(III)}} , D_{\text{Eu(III)}} < 3 \cdot 10^{-3}$ (determined by gamma counting, 300 µL samples)

Organic phase composition: **0.2 M** N-DP(DOM)P in **1-octanol**

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 1.0 / 4.0 M HNO₃

→ $D_{\text{Am(III)}} , D_{\text{Eu(III)}} < 0.01$ (determined by gamma counting, 300 µL samples)

Organic phase composition: **0.02 M N-DP(DOM)P + 0.5 M 2-bromodecanoic acid**
in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.01–0.3 M HNO₃

$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Eu(III)/Am(III)}}$	Comments
0.01	2.67	0.244	11	
0.03	0.106	0.01	11	
0.1	0.002	0.0007	2.9	
0.3	<<	<<	—	

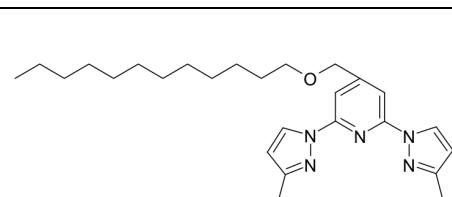
Organic phase composition: **0.2 M N-DP(DOM)P + 0.5 M 2-bromodecanoic acid**
in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.01 / 0.03 M HNO₃

$[\text{HNO}_3]_{ini}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Eu(III)/Am(III)}}$	Comments
0.01	10.5	0.82	13	
0.03	0.58	0.042	14	

Screening Test Results ST57.

Compound name:	4-(dodecyloxymethyl)-2,6-bis(3-methyl-1H-pyrazol-1-yl)pyridine
Acronym:	3-Me-N-DP(DOM)P
Received from:	CSIC-ICMAB
Tested by:	FZK-INE
Date tested:	30/09/2009



Organic phase composition: 0.02 M 3-Me-N-DP(DOM)P in kerosene
 Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.1–4.0 M HNO₃
 Phase volumes: 500 μL
 Temperature: 20 °C (temperature controlled)
 Shaking device: Orbital shaker, 2500/min
 Contacting time: 20 min

Results

$D_{\text{Am(III)}} , D_{\text{Eu(III)}} < 0.01$ (determined by gamma counting, 300 μL samples)

Organic phase composition: 0.02 M 3-Me-N-DP(DOM)P + 0.5 M 2-bromodecanoic acid in kerosene
 Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (1 kBq/mL each) in 0.01–0.3 M HNO₃
 Phase volumes: 500 μL
 Temperature: 20 °C (temperature controlled)
 Shaking device: Orbital shaker, 2500/min
 Contacting time: 20 min

Results

$[\text{HNO}_3]_{\text{ini}}$ [M]	$D_{\text{Am(III)}}$	$D_{\text{Eu(III)}}$	$SF_{\text{Eu(III)}/\text{Am(III)}}$	Comments
0.01	0.053	0.013	4	
0.03	0.002	0.01	2	
0.1	< 10 ⁻³	< 10 ⁻³	—	
0.3	<<	<<	—	

Screening Test Results ST58.

Compound name:	2,6-bis(1-octyl-1H-1,2,3-triazol-4-yl)-4-carboxymethyl-pyridine
Acronym:	EsPyTri
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	12/10/2009

Organic phase composition: 50 mM EsPyTri in 1-octanol

Aqueous phase composition: $^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (9 kBq/mL each) in HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

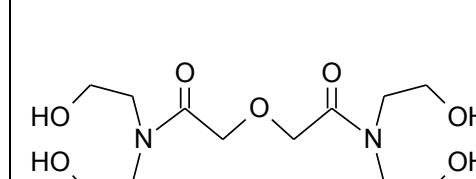
Distribution ratios

$[\text{HNO}_3] \text{ M}$	0.01	0.1	1	2^a	3.82^b	
$[\text{L}] \text{ } 5 \cdot 10^{-2} \text{ M}$	<< 0.001	<< 0.001	0.0005	0.0009	0.0020	D_{Eu}
in 1-octanol	<< 0.001	<< 0.001	0.0008	0.0020	0.0051	D_{Am}
	-	-	1.67	2.24	2.52	$SF_{\text{Am/Eu}}$

^{a,b}Mass balances are not completely respected (^a6-7% error, ^b13% error)

- Insoluble in kerosene at [EsPyTri] $\geq 25 \text{ mM}$
- Insoluble in 1-octanol at [EsPyTri] $\geq 50 \text{ mM}$

Screening Test Results ST59.

Compound name:	2,2'-oxybis(N,N-bis(2-hydroxyethyl)acetamide)
Acronym:	TWE-18
Received from:	TWENTE
Tested by:	FZJ
Date tested:	07/12/2009
	

Organic phase composition: 0.2M TODGA + 5%vol 1-octanol in TPH
 Aqueous phase composition: variable conc. of TWE-18 + 10µL tracers (^{241}Am , ^{152}Eu) + 0.5M NH_4NO_3 , initial pH = 1–4
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

Results

TWE-18	init. pH	D _{Am}	D _{Eu}	SF Eu/Am	Final pH
0	1.00	34.3	246.6	7.2	0.94
	2.00	41.0	256.9	6.3	1.94
	3.00	60.1	273.0	4.5	2.58
	4.01	75.6	323.7	4.3	2.72

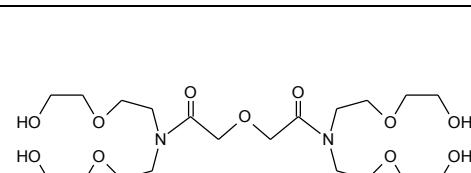
TWE-18	init. pH	D _{Am}	D _{Eu}	SF Eu/Am	Final pH
0.1 mol/L	1.12	0.198	0.454	2.3	1.28
	2.13	0.053	0.090	1.7	2.28
	3.11	0.004	0.003	0.9	3.00
	4.03	0.0004	0.0003	0.7	3.70

TWE-18	init. pH	D _{Am}	D _{Eu}	SF Eu/Am	Final pH
0.01 mol/L	1.14	10.6	58.4	5.5	1.12
	2.05	4.7	20.5	4.4	2.00
	3.16	0.96	2.2	2.3	2.79
	4.05	0.34	0.54	1.6	3.18

TWE-18	init. pH	D _{Am}	D _{Eu}	SF Eu/Am	Final pH
1 mmol/L	1.08	37.2	240.0	6.4	1.10
	2.09	28.7	176.4	6.1	2.01
	3.10	21.3	90.7	4.2	2.62
	4.06	16.7	68.7	4.1	2.78

Screening Test Results ST60.

Compound name:	2,2'-oxybis(N,N-bis(2-(2-hydroxyethoxy)ethyl)acetamide)
Acronym:	TWE-19
Received from:	TWENTE
Tested by:	FZJ
Date tested:	10/12/2009



Organic phase composition: 0.2M TODGA + 5%vol 1-octanol in TPH
 Aqueous phase composition: variable conc. of TWE-18 + 10µL tracers (^{241}Am , ^{152}Eu) + 0.5M NH_4NO_3 , initial pH = 1–4
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

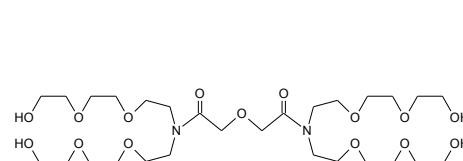
Results

TWE-19	init. pH	D _{Am}	D _{Eu}	SF Eu/Am	Final pH
0.1 mol/L	1.08	48.6	140.1	2.9	1.28
	2.05	22.8	73.8	3.2	2.28
	3.06	4.89	11.1	2.3	3.00
	4.01	0.540	0.918	1.7	3.70

The organic phase changes its colour after extraction depending on pH of the aqueous phase.

Screening Test Results ST61.

Compound name:	2,2'-oxybis(N,N-bis(2-(2-(2-hydroxyethoxy)ethoxy)ethyl)acetamide)
Acronym:	TWE-20
Received from:	TWENTE
Tested by:	FZJ
Date tested:	05/01/2010



Organic phase composition: 0.2M TODGA + 5%vol 1-octanol in TPH
 Aqueous phase composition: variable conc. of TWE-18 + 10µL tracers (^{241}Am , ^{152}Eu) + 0.5M NH_4NO_3 , initial pH = 1–4
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

Results

TWE-20	init. pH	D _{Am}	D _{Eu}	SF Eu/Am	Final pH
0.1 mol/L	1.11	624	837	1.3	1.24
	2.06	1444	1729	1.2	2.31
	3.07	167.4	322.8	1.9	3.20
	4.12	13.2	24.1	1.8	4.00
*		84.5	371.0	4.4	

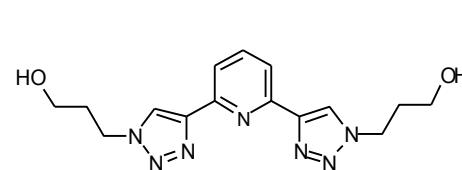
* 3 mol/L HNO_3

No problem observed while dissolving 0.1 mol/L TWE-20 in 3M HNO_3 , although after ~30 minutes some precipitation appeared.

When contacting TWE-20 in 3 mol/L HNO_3 with TPH, the organic phase changed its colour. Nevertheless, no extraction of Am(III) and Eu(III) tracers to the organic phase has appeared.

Screening Test Results ST62.

Compound name:	3,3'-(4,4'-(pyridine-2,6-diyl)bis(1H-1,2,3-triazole-4,1-diyl))dipropan-1-ol
Acronym:	PyTri-diol
Received from:	UniPr
Tested by:	PoliMi
Date tested:	10/02/2010



Organic phase composition:	TODGA 0.2 M in kerosene/1-octanol 95/5 vol.
Aqueous phase composition:	$^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (9 kBq/mL each) + PyTri-diol 0.005 M + NH_4NO_3 0.5 M, pH=3 (obtained by partial neutralization of 0.1 M HNO_3 with NaOH)
Phase volumes:	500 μL
Temperature:	22°C (temperature controlled)
Shaking device:	orbital shaker, 1000/min
Contacting time:	60 min

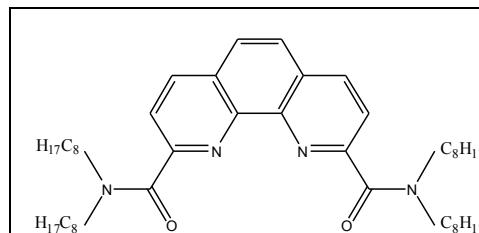
Results

$[L] = 0$ $[\text{NH}_4\text{NO}_3] =$ 0.5 mol/L $[\text{HNO}_3] =$ 0.1 mol/L	$[L] =$ 5 mmol/L $[\text{NH}_4\text{NO}_3] =$ 0.5 mol/L $[\text{HNO}_3] =$ 0.1 mol/L	$[L] = 0$ $[\text{NH}_4\text{NO}_3] =$ 0.5 mol/L $[\text{HNO}_3] =$ 0.01 mol/L	$[L] =$ 5 mmol/L $[\text{NH}_4\text{NO}_3] =$ 0.5 mol/L $[\text{HNO}_3] =$ 0.01 mol/L	$[L] = 0$ $[\text{NH}_4\text{NO}_3] =$ 0.5 mol/L $[\text{HNO}_3] =$ 0.001 mol/L	$[L] =$ 5 mmol/L $[\text{NH}_4\text{NO}_3] =$ 0.5 mol/L $[\text{HNO}_3] =$ 0.001 mol/L	
32.37	7.269	25.69	0.823	24.3	0.331	D_{Am}
196	197.3	166.07	68.82	157	27.54	D_{Eu}
6.05	27.1	6.31	83.6	6.46	83.2	$SF_{\text{Eu/Am}}$

- Mass balance error of about 5%: possible formation of an invisible third phase.

Screening Test Results ST63.

Compound name:	<i>N,N,N',N'-tetraoctyl 1,10-phenanthroline -2,9-carboxamide</i>
Acronym:	T8-PHEN-CAM
Received from:	POLIMI
Tested by:	POLIMI
Date tested:	10/02/2010



Organic phase composition: 10 mM T8-PHEN-CAM in 1-octanol or kerosene or NPHE (see results)

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (9 kBq/mL each) in HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

Distribution ratios

D-Am			
[HNO_3]	1-Octanol	kerosene	NPHE
0,01	-	0,017	-
0,1	-	-	-
1	0,0005	-	0,0073
3,82	0,0031	0,0265	0,0562

D-Eu			
[HNO_3]	1-Octanol	kerosene	NPHE
0,01	-	0,0157	-
0,1	-	-	-
1	0,0001	-	0,001
3,82	0,0018	0,0087	0,0066

SF			
[HNO_3]	1-Octanol	kerosene	NPHE
0,01	-	1,08	-
0,1	-	-	-
1	3,5	-	7,62
3,82	1,68	3,04	8,56

Organic phase composition:	10 mM T8-PHEN-CAM + 20 mM Br-Cosan in NPHE (see results, [L]/[S]=0.5)
Aqueous phase composition:	$^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (9 kBq/mL each) in HNO_3
Phase volumes:	500 μL each
Temperature:	$23 \pm 1^\circ\text{C}$; thermostatted: no
Shaking device:	orbital shaker, 1000/min
Contacting time:	60 min

Results

Distribution ratios

D-Am

[HNO_3]	NPHE+Br-Cosan ([L]/[S]=0,5)	NPHE+Br-Cosan ([L]/[S]=2)
0,01	>>1000	515,4
0,1	1,45	8,16
1	0,0546	0,291
3,82	0,0188	0,164

D-Eu

[HNO_3]	NPHE+Br-Cosan ([L]/[S]=0,5)	NPHE+Br-Cosan ([L]/[S]=2)
0,01	1048	62,95
0,1	0,253	0,234
1	0,0138	0,007
3,82	0,0022	0,013

SF

[HNO_3]	NPHE+Br-Cosan ([L]/[S]=0,5)	NPHE+Br-Cosan ([L]/[S]=2)
0,01	-	8,19
0,1	5,74	34,8
1	3,96	41,7
3,82	8,71	12,5

Screening Test Results ST64.

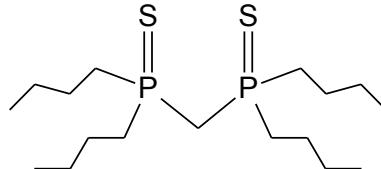
Compound name: **bis(dibutylphosphorothioyl)methane**

Acronym: TWE-23

Received from: TWENTE

Tested by: FZJ

Date tested: 10/02/2010



Organic phase composition: 0.1M TWE-23 in TPH

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C (temperature controlled)

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

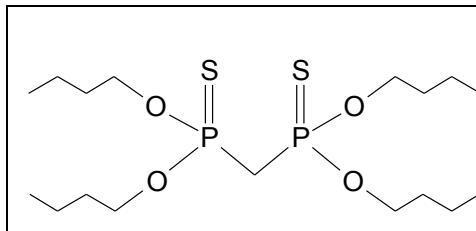
Contacting time: 60 min

Results

Aq. Phase		D values		SF Am/Eu	Comments
HNO ₃ [mol/L]	measured	Am-241	Eu-152		
0.010	0.0113	0.12	0.12	1.02	
0.10	0.1097	0.219	0.224	0.98	
1.0	1.0090	0.002	0.002	0.95	
2.0	1.9855	0.0018	0.0018	0.95	
3.0	3.0417	-	-	-	precipitation
4.0	4.0133	0.00063	0.00101	0.62	

Screening Test Results ST65.

Compound name:	<i>O,O,O',O'-tetrabutyl methylenediphosphonothioate</i>
Acronym:	TWE-24
Received from:	TWENTE
Tested by:	FZJ
Date tested:	25/01/2010



Organic phase composition: 0.09M TWE-24 in TPH/1-octanol (7:1)
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

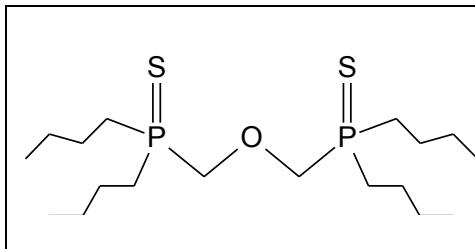
Results

Aq. Phase		D values		SF Am/Eu	Comments
HNO ₃ [mol/L]	measured	Am-241	Eu-152		
0.010	0.0113	424	508	0.83	*
0.10	0.1097	174	127	1.37	
1.0	1.0090	431	290	1.49	
2.0	1.9855	132	122	1.09	
3.0	3.0417	4.3	5.6	0.76	
4.0	4.0133	14.7	17.1	0.86	

*thin layer of white emulsion between the aqueous and the organic phase

Screening Test Results ST66.

Compound name:	1,3-bis(dibutylthio phosphinoyl)-2-oxapropane
Acronym:	TWE-27
Received from:	TWENTE
Tested by:	FZJ
Date tested:	08/02/2010



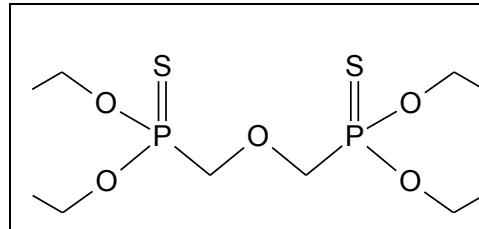
Organic phase composition: 0.1M TWE-27 in TPH
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

Results

Aq. Phase		D values		SF Am/Eu	Comments
HNO ₃ [mol/L]	measured	Am-241	Eu-152		
0.010	0.0113	< 0.01	< 0.01		
0.10	0.1097	< 0.01	< 0.01		
1.0	1.0090	< 0.01	< 0.01		
2.0	1.9855	< 0.01	< 0.01		
3.0	3.0417	< 0.01	< 0.01		
4.0	4.0133	< 0.01	< 0.01		

Screening Test Results ST67.

Compound name:	<i>O,O,O',O'-tetraethoxybis(methylene)diphosphonothioate</i>
Acronym:	TWE-28
Received from:	TWENTE
Tested by:	FZJ
Date tested:	08/02/2010



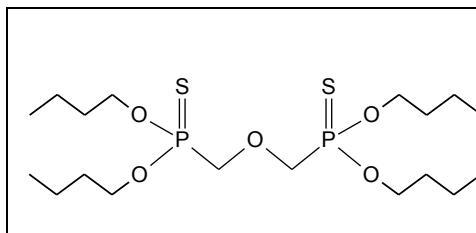
Organic phase composition: 0.1M TWE-28 in TPH
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

Results

Aq. Phase		D values		SF Am/Eu	Comments
HNO ₃ [mol/L]	measured	Am-241	Eu-152		
0.010	0.0113	< 0.01	< 0.01		
0.10	0.1097	< 0.01	< 0.01		
1.0	1.0090	< 0.01	< 0.01		
2.0	1.9855	< 0.01	< 0.01		
3.0	3.0417	< 0.01	< 0.01		
4.0	4.0133	< 0.01	< 0.01		

Screening Test Results ST68.

Compound name:	<i>O,O,O',O'-tetrabutyloxybis(methylene)diphosphonothioate</i>
Acronym:	TWE-29
Received from:	TWENTE
Tested by:	FZJ
Date tested:	26/01/2010



Organic phase composition: 0.1M TWE-29 in TPH
 Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm
 Contacting time: 60 min

Results

Aq. Phase		D values		SF Am/Eu	Comments
HNO ₃ [mol/L]	measured	Am-241	Eu-152		
0.010	0.0113	0.20	0.19	1.07	
0.10	0.1097	0.041	0.063	0.65	
1.0	1.0090	0.004	0.006	0.71	
2.0	1.9855	0.00015	0.00014	1.06	
3.0	3.0417	0.00018	0.00024	0.77	
4.0	4.0133	0.00016	0.00029	0.55	

Screening Test Results ST69.

Compound name:	<i>N,N,N',N'-tetraoctyl 1,10-phenanthroline -2,9-carbothioamide</i>
Acronym:	T8-PHEN-TAM
Received from:	POLIMI
Tested by:	POLIMI
Date tested:	10/02/2010

Organic phase composition: 10 mM T8-PHEN-TAM in 1-octanol or kerosene or NPHE (see results)

Aqueous phase composition: $^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (9 kBq/mL each) in HNO_3

Phase volumes: 500 μL each

Temperature: $23 \pm 1^\circ\text{C}$

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

Distribution ratios

<i>D-Am</i>			
[HNO_3]	1-octanol	kerosene	NPHE
0.01	-	0.1236	0.001
0.1	-	-	-
1	-	-	-
3.82	0.0019	-	-

<i>D-Eu</i>			
[HNO_3]	1-octanol	kerosene	NPHE
0.01	-	0.122	0.0007
0.1	-	-	-
1	-	-	-
3.82	0.0019	-	-

<i>SF</i>			
[HNO_3]	1-octanol	kerosene	NPHE
0.01	-	1.01	1.43
0.1	-	-	-
1	-	-	-
3.82	1	-	-

Organic phase composition:	10 mM T8-PHEN-TAM + 20 mM Br-Cosan in NPHE (see results, [L]/[S]=0.5)
Aqueous phase composition:	$^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (9 kBq/mL each) in HNO_3
Phase volumes:	500 μL each
Temperature:	$23 \pm 1^\circ\text{C}$; thermostatted: no
Shaking device:	orbital shaker, 1000/min
Contacting time:	60 min

Results

Distribution ratios

D-Am

[HNO_3]	NPHE+Br-Cosan ([L]/[S]=0,5)	NPHE+Br-Cosan ([L]/[S]=2)	
0,01	1,53	0,0036	
0,1	0,0568	-	
1	0,0035	-	
3,82	0,0055	0,0687	

D-Eu

[HNO_3]	NPHE+Br-Cosan ([L]/[S]=0,5)	NPHE+Br-Cosan ([L]/[S]=2)	
0,01	0,623	0,0046	
0,1	0,0221	-	
1	0,0015	-	
3,82	0,0011	0,0051	

SF

[HNO_3]	NPHE+Br-Cosan ([L]/[S]=0,5)	NPHE+Br-Cosan ([L]/[S]=2)	
0,01	2,45	0,79	
0,1	2,57	-	
1	2,31	-	
3,82	4,87	13,4	

Screening Test Results ST70.

Compound name:	4,4'-dimethyl-6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine
Acronym:	MeCyMe ₄ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	2/3/2010

Organic phase composition: 5 mmol/L MeCyMe₄-BTBP in cyclohexanone

Aqueous phase composition: (0.01 – 4) mol/L HNO₃

Phase volumes: 1 mL

Temperature: 22°C

Shaking device: GFL 3005 orbital shaker (Germany); 250/min

Contacting time: 6 h

Results

Solubility (17 – 19) mmol/L

Distribution ratios

c(HNO ₃)	D(Am)		R(%)	D(Eu)		R(%)	SF(Am/Eu)			
	0,01	0,1		0,1	0,1		0,1	0,1	0,1	
0,01	0,4	+/-	93,4	0,006	+/-	0,000	94,3	59,0	+/-	5,3
0,1	1,2	+/-	98,1	0,025	+/-	0,002	107,1	46,4	+/-	3,0
0,5	20,4	+/-	104,4	0,125	+/-	0,004	94,2	163,5	+/-	16,6
1	15,6	+/-	85,7	0,104	+/-	0,003	104,7	150,1	+/-	14,2
2	27,6	+/-	98,6	0,212	+/-	0,005	96,0	130,2	+/-	18,8
4	13,8	+/-	73,9	0,122	+/-	0,003	130,2	113,0	+/-	10,7

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.

Screening Test Results ST71.

Compound name:	4,4'-dimethyl-6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine
Acronym:	MeCyMe ₄ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	11/3/2010

Organic phase composition: 5 mmol/L MeCyMe₄-BTBP in 1-octanol

Aqueous phase composition: (0.01 – 4) mol/L HNO₃

Phase volumes: 1 mL

Temperature: 22°C

Shaking device: GFL 3005 orbital shaker (Germany); 250/min

Results

Solubility (6 – 8) mmol/L

Distribution ratios (contacting time: 6 h)

c(HNO ₃)	D(Am)		R(%)	D(Eu)		R(%)	SF(Am/Eu)	
	0,007	+/-		0,001	105,8		101,7	> 5
0,01	0,040	+/-	0,002	101,6	< 0,003		98,9	> 27
0,1	0,156	+/-	0,005	101,9	0,012	+/-	104,1	13,0
0,5	0,323	+/-	0,009	107,6	0,024	+/-	104,1	+/- 1,3
1	0,610	+/-	0,015	99,8	0,028	+/-	105,2	13,5
2	0,572	+/-	0,014	101,5	0,022	+/-	105,1	+/- 1,0
4							26,0	+/- 1,4

The errors given are 1 sigma and they include counting statistics, only.

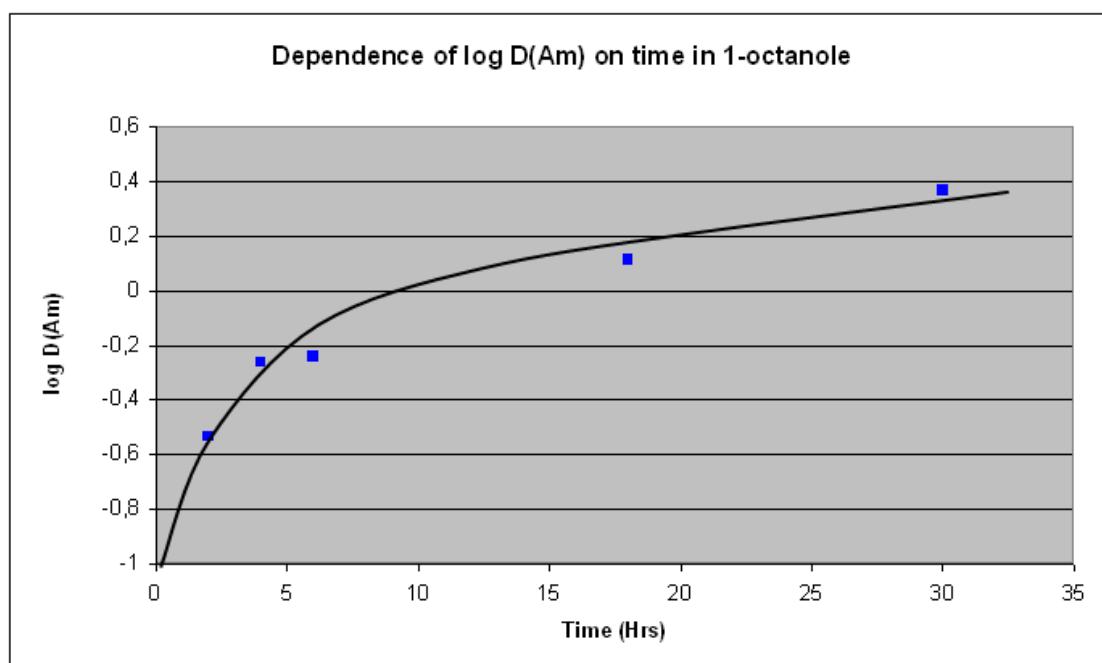
The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.

Distribution ratios (varied contacting time)

Time (h)	D (Am)			R(%)	D (Eu)			R(%)	SF(Am/Eu)		
2	0,292	+/-	0,008	107,9	0,023	+/-	0,002	112,4	12,7	+/-	1,1
4	0,547	+/-	0,013	112,2	0,024	+/-	0,002	113,8	22,8	+/-	1,8
6	0,572	+/-	0,014	101,5	0,022	+/-	0,002	105,1	26,0	+/-	2,0
18	1,301	+/-	0,033	96,0	0,021	+/-	0,002	109,7	62,0	+/-	5,2
30	2,330	+/-	0,075	101,4	0,026	+/-	0,001	113,3	89,6	+/-	5,9

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.



Screening Test Results ST72.

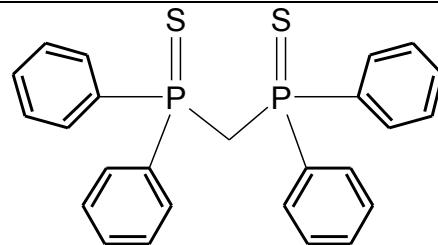
Compound name: **bis(diphenylphosphorothioyl)methane**

Acronym: TWE-25

Received from: TWENTE

Tested by: FZJ

Date tested: 03/03/2010



Organic phase composition: 0.01 mol/L TWE-25 in 1-octanol

Aqueous phase composition: (0.01 – 4) mol/L HNO₃

Phase volumes: 500 μL

Temperature: 22°C (temperature controlled)

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200/min

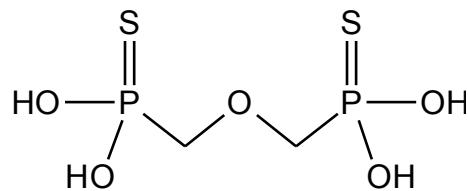
Contacting time: 60 min

Results

Solubility 0.01 mol/L TWE-25 is not soluble in TPH or 1-octanol

Screening Test Results ST73.

Compound name:	oxybis(methylene)diphosphonothioic O,O-acid
Acronym:	TWE-26
Received from:	TWENTE
Tested by:	FZJ
Date tested:	13/04/2010



Organic phase composition: 0.2 mol/LTODGA + 5% (vol.) 1-octanol in TPH
 Aqueous phase composition: < 0.03 mol/L TWE-26 + 0.5 mol/L NH₄NO₃, initial pH = 1–4
 Phase volumes: 500 μL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200/min
 Contacting time: 60 min

Results

$$[TWE-26] = 0$$

Aq. Phase		D values		SF Am/Eu	Comments
pH _{ini}	pH _{eq}	Am-241	Eu-152		
1.00	0.94	34.3	247	7.2	
2.00	1.94	41.0	257	6.3	
3.00	2.58	60.1	273	4.5	
4.01	2.72	75.6	324	4.3	

$$[TWE-26] < 0.03 \text{ mol/L} *$$

Aq. Phase		D values		SF Am/Eu	Comments
pH _{ini}	pH _{eq}	Am-241	Eu-152		
1.07	1.07	17.9	127	7.1	
2.06	1.96	8.4	46.7	5.6	
3.13	2.69	8.9	38.5	4.4	
4.14	2.94	12.4	46.2	3.7	

* at 0.03 mol/L TWE-26 a small precipitation of the ligand is observed (not fully dissolved)

Screening Test Results ST74.

Compound name:	1,3-bis(diphenylthiophosphinoyl)-2-oxapropane
Acronym:	TWE-30
Received from:	TWENTE
Tested by:	FZJ
Date tested:	03/03/2010

Organic phase composition: 0.01 mol/L TWE-30 in 1-octanol
 Aqueous phase composition: (0.01 – 4) mol/L HNO₃
 Phase volumes: 500 µL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200/min
 Contacting time: 60 min

Results

Aq. Phase	D values		SF Am/Eu	Comments
	HNO ₃ [mol/L]	Am-241	Eu-152	
0.01	0.0016	0.0019	0.833	
0.10	0.0004	0.0005	0.779	
1.03	0.0033	0.0003	10.377	
1.98	0.0008	0.0007	1.101	
3.04	0.0018	0.0016	1.147	
4.01	0.0014	0.0013	1.082	

Screening Test Results ST75.

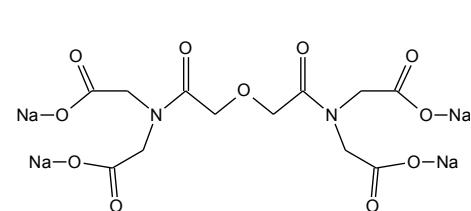
Compound name: **N,N,N',N'-tetra sodiumacetate diglycolamide**

Acronym: TWE-31

Received from: TWENTE

Tested by: FZJ

Date tested: 13/04/2010



Organic phase composition: 0.2 mol/LTODGA + 5% (vol.) 1-octanol in TPH

Aqueous phase composition: 0.1 mol/L TWE-31 + 0.5 mol/L NH₄NO₃, initial pH = 1–4

Phase volumes: 500 μL

Temperature: 22°C (temperature controlled)

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200/min

Contacting time: 60 min

Results

$$[TWE-31] = 0$$

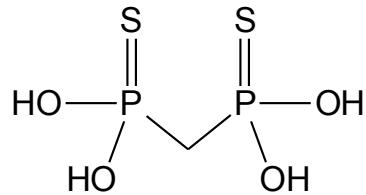
Aq. Phase		D values		SF Eu/Am	Comments
pH _{ini}	pH _{eq}	Am-241	Eu-152		
1.00	0.94	34.3	247	7.2	
2.00	1.94	41.0	257	6.3	
3.00	2.58	60.1	273	4.5	
4.01	2.72	75.6	324	4.3	

$$[TWE-31] = 0.1 \text{ mol/L}$$

Aq. Phase		D values		SF Eu/Am	Comments
pH _{ini}	pH _{eq}	Am-241	Eu-152		
1.09	0.98	55.5	423	7.6	
2.03	1.84	36.7	203	5.5	
3.02	2.71	9.74	35.6	3.7	
4.00	3.54	3.3	6.27	1.9	

Screening Test Results ST76.

Compound name:	methylenebisphosphonothioic O,O-acid
Acronym:	TWE-32
Received from:	TWENTE
Tested by:	FZJ
Date tested:	20/04/2010



Organic phase composition: 0.2 mol/LTODGA + 5% (vol.) 1-octanol in TPH
 Aqueous phase composition: 0.1 mol/L TWE-32 + 0.5 mol/L NH₄NO₃, initial pH = 1–4
 Phase volumes: 500 μL
 Temperature: 22°C (temperature controlled)
 Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200/min
 Contacting time: 60 min

Results

$$[TWE-32] = 0$$

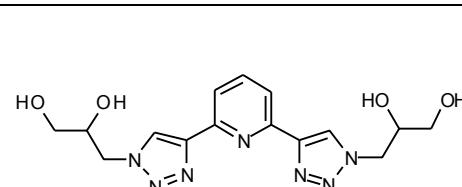
Aq. Phase		D values		SF Eu/Am	Comments
pH _{ini}	pH _{eq}	Am-241	Eu-152		
1.00	0.94	34.3	247	7.2	
2.00	1.94	41.0	257	6.3	
3.00	2.58	60.1	273	4.5	
4.01	2.72	75.6	324	4.3	

$$[TWE-32] = 0.1 \text{ mol/L}$$

Aq. Phase		D values		SF Eu/Am	Comments
pH _{ini}	pH _{eq}	Am-241	Eu-152		
1.09	1.02	0.051	0.103	2.0	
2.05	1.95	0.006	0.005	0.9	
2.99	3.00	0.003	0.003	1	
4.00	3.68	0.003	0.002	0.8	

Screening Test Results ST77.

Compound name:	3,3'-(4,4'-(pyridine-2,6-diyl)bis(1H-1,2,3-triazol-4,1-diyl))dipropane-1,2-diol
Acronym:	PyTri-Tetraol
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	15–23/06/2010



Organic phase composition: 0.2 mol/LTODGA + 5% (vol.) 1-octanol in kerosene

Aqueous phase composition: $^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (4.5 kBq/mL each) in
 (a) 0.5 mol/L NH_4NO_3 , pH = 1–3 (obtained by partial neutralisation of 0.1 mol/L HNO_3 with NaOH)
 (b) HNO_3
 with or without 0.05 mol/L PyTri-Tetraol

Phase volumes: 500 μL

Temperature: 22°C

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$$[\text{PyTri-Tetraol}] = 0$$

Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
pH = 3	24.3	157	6.5	
pH = 2	25.7	166	6.3	
pH = 1	32.4	196	6.05	
0.5 mol/L HNO_3	54.1	364	6.7	
1 mol/L HNO_3	348	1018	2.9	

$[PyTri-Tetraol] = 0.05 \text{ mol/L}$

Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
pH = 3	0.118	10.7	91	
pH = 2	0.112	8.88	79	
pH = 1	0.42	46.1	110	
0.5 mol/L HNO ₃	6.75	233	35	
1 mol/L HNO ₃	128	761	5.9	

$[PyTri-Tetraol] = 0.15 \text{ mol/L}$

Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
pH = 2	0.077	2.52	32.6	
pH = 1	0.202	5.08	25.2	
0.5 mol/L HNO ₃	0.772	87.0	113	
1 mol/L HNO ₃	34	649	19	

Screening Test Results ST78.

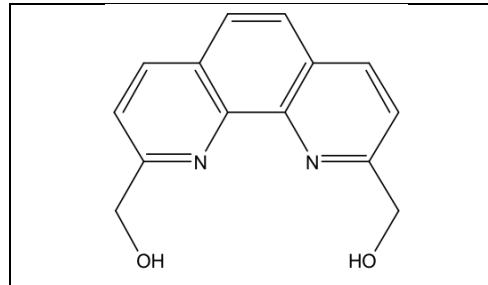
Compound name: **2,9-bis(hydroxymethyl)-1,10-phenanthroline**

Acronym: PHEN-dialcohol

Received from: POLIMI

Tested by: POLIMI

Date tested: 14–21/06/2010



Organic phase composition: 0.2 mol/LTODGA + 5% (vol.) 1-octanol in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (4.5 kBq/mL each) in
 (a) 0.5 mol/L NH_4NO_3 + 0.1 mol/L HNO_3
 (b) HNO_3
 with or without 0.02 mol/L PHEN-dialcohol

Phase volumes: 500 μL

Temperature: 22°C

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$$[\text{PHEN-dialcohol}] = 0$$

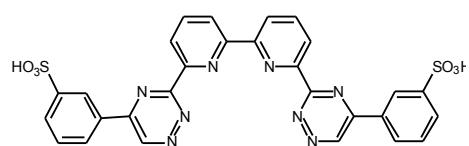
Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.5 mol/L NH_4NO_3 + 0.1 mol/L HNO_3	32.37	196	6.05	
0.1 mol/L HNO_3	9.07	62.13	6.66	
0.5 mol/L HNO_3	54.13	364.33	6.73	
1 mol/L HNO_3	348	1018	2.9	

$$[\text{PHEN-dialcohol}] = 0.02 \text{ mol/L}$$

Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.5 mol/L NH_4NO_3 + 0.1 mol/L HNO_3	0.96	22.1	23	
0.1 mol/L HNO_3	0.032	0.405	12.7	
0.5 mol/L HNO_3	11.6	168	14.5	
1 mol/L HNO_3	167	770	4.61	

Screening Test Results ST79.

Compound name:	3,3'-[3-(2,2'-Bipyridine-6,6'-diyl)-1,2,4-triazine-5,5-diyl]dibenesulfonic acid
Acronym:	(PhSO ₃ H)-BTBP
Received from:	UREAD
Tested by:	KIT-INE
Date tested:	02/09/2010



Results

Solubility < 10 mmol/L in H₂O or 0.5 mol/L HNO₃

Screening Test Results ST80.

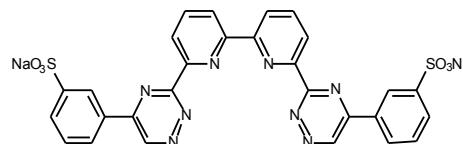
Compound name: **Disodium 3,3'-[3-(2,2'-bipyridine-6,6'-diyl)-1,2,4-triazine-5,5-diyl]dibenzenesulfonate**

Acronym: (PhSO₃Na)-BTBP

Received from: UREAD

Tested by: KIT-INE

Date tested: 02/09/2010

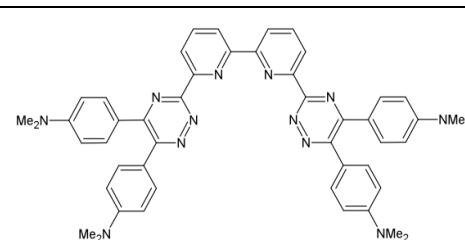


Results

Solubility < 10 mmol/L in H₂O or 0.5 mol/L HNO₃

Screening Test Results ST81.

Compound name:	6,6'-Bis{5,6-bis[4-(dimethylamino)phenyl]-1,2,4-triazin-3-yl}-2,2'-bipyridine
Acronym:	(PhNMe ₂) ₂ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	11/08/2010



Results

Organic phase composition: 0.2 M TODGA + 5 % vol. 1-octanol in kerosene

Aqueous phase composition:
i) ²⁴¹Am(III) + ¹⁵²Eu(III) in 0.5 M NH₄NO₃
ii) same as i) but with hydrophilic complexing agent added

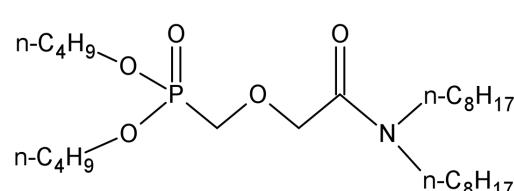
Solubility: The solubility in nitric acid was very low. It was not possible to make solution with the (PhNMe₂)₂-BTBP concentration exceed 1.4 mmolar

Solubility of (PhNMe₂)₂-BTBP in nitric acid

c(HNO ₃)	Colour of solution/suspension	Solubility of BTBP [10 ⁻³ mol/l]
0.1	brown	lower than 1
1	violet-brown	lower than 1
4	violet-pink	1.4

Screening Test Results ST82.

Compound name:	dibutyl ((2-(dioctylamino)-2-oxoethoxy)methyl)phosphonate	
Acronym:	TWE-33	
Received from:	TWENTE	
Tested by:	FZJ	
Date tested:	22/10/2010	



Organic phase composition: 0.1M TWE-33 in TPH

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

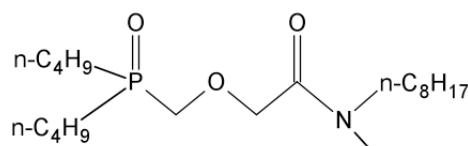
Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

Sample	Aq. Phase		Tracer yes/no	D-values		SF Eu/Am	Comments
	HNO ₃ [mol/L]	measured		Am-241	Eu-152		
J1	0.01	0.0096	yes	0.0043	0.0029	0.67	Thermostated 22C
J2	0.1	0.1025	yes	0.0096	0.0099	1.03	
J3	1.0	1.0308	yes	0.040	0.062	1.55	
J4	2.0	1.9855	yes	0.17	0.44	2.56	
J5	3.0	3.0490	yes	0.43	1.64	3.79	
J6	4.0	4.0133	yes	0.86	4.62	5.34	

Screening Test Results ST83.

Compound name: 2-((dibutylphosphoryl)methoxy)-N,N-diOctylacetamide	
Acronym:	TWE-34
Received from:	TWENTE
Tested by:	FZJ
Date tested:	22/10/2010



Organic phase composition: 0.1M TWE-34 in TPH

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

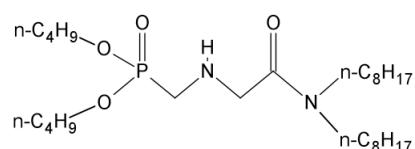
Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

Sample	Aq. Phase		Tracer	D-values		SF Eu/Am	Comments
	HNO ₃ [mol/L]	measured		Am-241	Eu-152		
J7	0.01	0.0096	yes	0.023	0.018	0.78	Thermostated 22C
J8	0.1	0.1025	yes	0.619	0.713	1.15	
J9	1.0	1.0308	yes	1.938	2.864	1.48	
J10	2.0	1.9855	yes	1.498	2.608	1.74	
J11	3.0	2.9539	yes	1.860	3.875	2.08	
J12	4.0	4.0133	yes	3.479	8.147	2.34	

Screening Test Results ST84.

Compound name:	dibutyl (((2-(dioctylamino)-2-oxoethyl)amino)methyl)phosphonate
Acronym:	TWE-35
Received from:	TWENTE
Tested by:	FZJ
Date tested:	25/10/2010



Organic phase composition: 0.1M TWE-35 in TPH

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

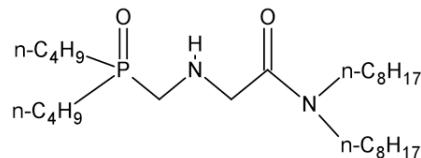
Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

Sample	Aq. Phase		Tracer yes/no	D-values		SF Am/Eu	Comments
	HNO ₃ [mol/L]	measured		Am-241	Eu-152		
J13	0.01	0.0096	yes	2.04	1.18	1.73	Thermostated 22C
J14	0.1	0.1025	yes	0.072	0.059	1.23	
J15	1.0	1.0308	yes	0.111	0.106	1.05	
J16	2.0	2.0333	yes	0.055	0.054	1.01	
J17	3.0	2.9539	yes	0.025	0.025	0.99	
J18	4.0	4.0133	yes	0.028	0.025	1.12	

Screening Test Results ST85.

Compound name:	2-(((dibutylphosphoryl)methyl)amino)-N,N-dioctylacetamide
Acronym:	TWE-36
Received from:	TWENTE
Tested by:	FZJ
Date tested:	25/10/2010



Organic phase composition: 0.1M TWE-36 in TPH

Aqueous phase composition: 0.01 – 4M HNO₃ + 10µL tracers (²⁴¹Am, ¹⁵²Eu, ²⁴⁴Cm)

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

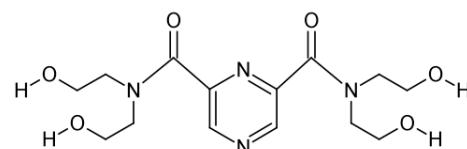
Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

Sample	Aq. Phase		Tracer yes/no	D-values		SF Am/Eu	Comments
	HNO ₃ [mol/L]	measured		Am-241	Eu-152		
J19	0.01	0.0096	yes	12.12	5.47	2.22	Thermostated 22C
J20	0.1	0.1025	yes	0.026	0.014	1.96	
J21	1.0	1.0308	yes	0.037	0.023	1.65	
J22	2.0	1.9855	yes	0.0113	0.0075	1.51	
J23	3.0	2.9539	yes	0.0090	0.0060	1.49	
J24	4.0	4.0133	yes	0.0072	0.0052	1.39	

Screening Test Results ST86.

Compound name:	N2,N2,N6,N6-tetrakis(2-hydroxyethyl)pyrazine-2,6-dicarboxamide
Acronym:	TWE-37
Received from:	TWENTE
Tested by:	FZJ
Date tested:	25/10/2010



Organic phase composition: 0.2M TODGA + 5%vol Octanol in TPH

Aqueous phase composition: 0.1M TWE-37 + 10µL tracers (^{241}Am , ^{152}Eu) + 0.5M NH_4NO_3 , initial pH = 1 – 4

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min

No ligand in the aqueous phase

Sample	Aq. Phase		Tracer yes/no	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH		Am-241	Eu-152			
M524	0.5	1.00	yes	34.3	246.6	7.2	0.94	60 min Alublock thermo- stated 22°C
M525	0.5	2.00	yes	41.0	256.9	6.3	1.94	
M526	0.5	3.00	yes	60.1	273.0	4.5	2.58	
M535	0.5	4.01	yes	75.6	323.7	4.3	2.72	

0.1 mol/L of TWE-37 in the aqueous phase

Sample	Aq. Phase		Tracer yes/no	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH		Am-241	Eu-152			
J25	0.5	3.97	yes	0.131	0.990	7.6	3.51	60 min Alublock thermo- stated 22°C
J26	0.5	3.06	yes	0.138	1.257	9.1	3.22	
J27	0.5	2.03	yes	1.067	15.71	14.7	2.37	
J28	0.5	1.05	yes	29.94	184.0	6.1	1.35	

Screening Test Results ST87.

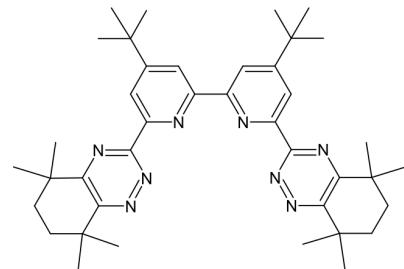
Compound name: **4,4'-Di-*tert*-butyl-6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine**

Acronym: tBu-CyMe₄-BTBP

Received from: UREAD

Tested by: CTU

Date tested: 03/08/2010 - 05/08/2010



Extraction Tests (in octanol)

Organic phase composition: 0.0048M tBuCyMe₄-BTBP in 1-octanol

Aqueous phase composition: (0.1 - 4) M HNO₃

Phase volumes: 1000 μL

Temperature: ambient (cca 22°C); not thermostatted

Shaking device: GFL 3005 orbital shaker (Germany); 250 mot/min

Solubility: 4.8 - 5 mM

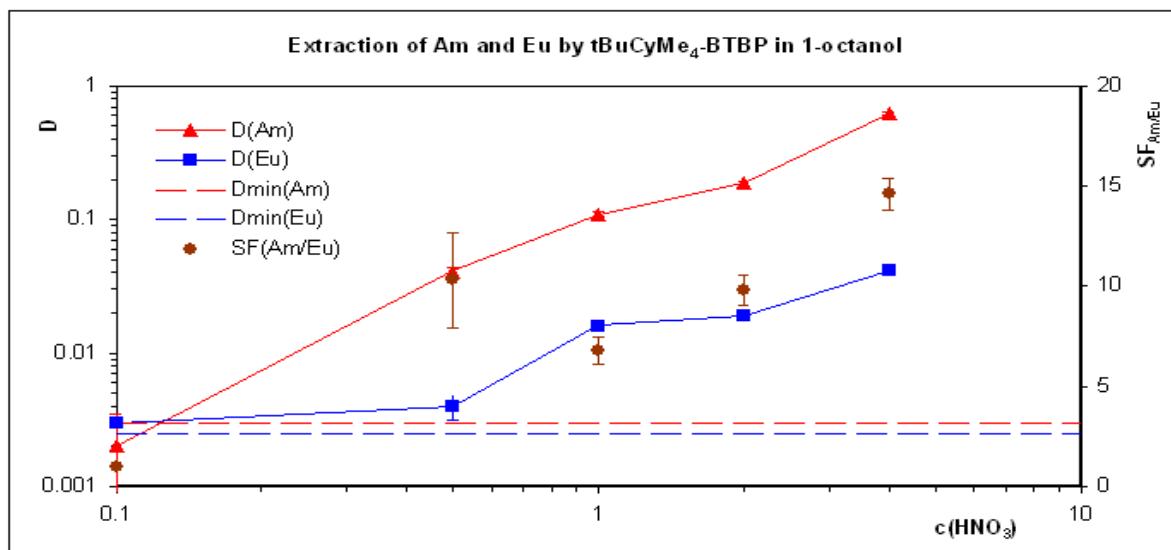
Contacting time: 6 hrs

results:

c(HNO ₃)	D(Am)		R(%)	D(Eu)		R(%)	SF(Am/Eu)				
	0.002	+/-		0.001	121.4	< 0.003	+/-	0.001	123.6	> 1	+/-
0.5	0.041	+/-	0.003	112.2	0.004	+/-	0.001	112.9	10.3	+/-	0.7
1	0.109	+/-	0.004	122.4	0.016	+/-	0.001	124.9	6.8	+/-	0.8
2	0.186	+/-	0.006	129.8	0.019	+/-	0.001	129.9	9.8	+/-	0.8
4	0.621	+/-	0.015	129.1	0.042	+/-	0.002	130.7	14.8	+/-	0.8

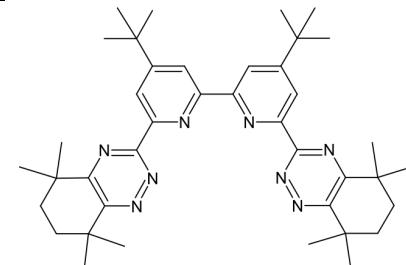
The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.



Screening Test Results ST88.

Compound name:	4,4'-Di- <i>tert</i> -butyl-6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine
Acronym:	tBu-CyMe ₄ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	10/09/2010 - 15/09/2010



Kinetics tests (in octanol)

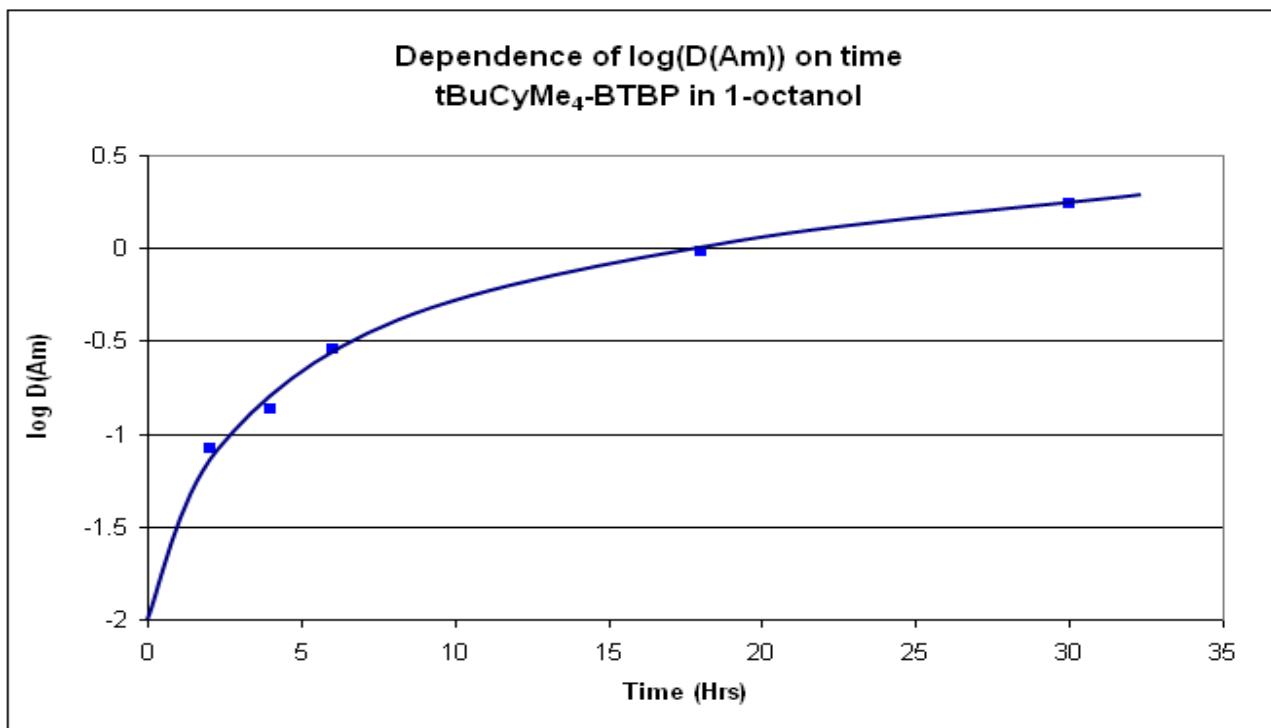
Organic phase composition:	4.8 mM tBuCyMe ₄ -BTBP in 1-octanol
Aqueous phase composition:	4 M HNO ₃
Phase volumes:	1000 µL
Temperature:	ambient (cca 22°C); not thermostatted
Shaking device:	GFL 3005 orbital shaker (Germany); 250 mot/min
Contacting time:	2, 4, 6, 18, and 30 hrs

Results:

Time (h)	D (Am)		R (%)	D (Eu)		R (%)	SF(Am/Eu)				
	0.083	+/-		0.004	110.6		0.017	+/-	0.001	114.2	4.9
4	0.137	+/-	0.005	110.8	0.023	+/-	0.001	113.1	6.0	+/-	0.4
6	0.285	+/-	0.008	105.7	0.022	+/-	0.001	112.7	13.0	+/-	0.9
18	0.954	+/-	0.023	106.2	0.046	+/-	0.002	113.3	20.7	+/-	1.0
30	1.756	+/-	0.048	102.8	0.053	+/-	0.002	107.7	33.1	+/-	1.6

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.



Screening Test Results ST89.

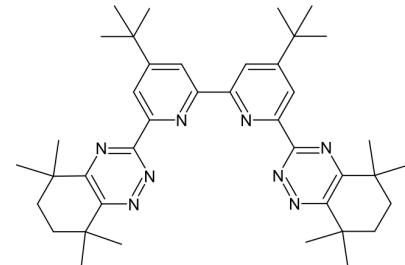
Compound name: **4,4'-Di-*tert*-butyl-6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine**

Acronym: tBu-CyMe₄-BTBP

Received from: UREAD

Tested by: CTU

Date tested: 04/08/2010 - 06/08/2010



Extraction Tests (in cyclohexanone)

Organic phase composition: 0.005M tBuCyMe₄-BTBP in cyclohexanone

Aqueous phase composition: (0.1 - 3) M HNO₃

Phase volumes: 1000 µL

Temperature: ambient (cca 22°C); not thermostatted

Shaking device: GFL 3005 orbital shaker (Germany); 250 mot/min

Solubility: 14 - 17 mM

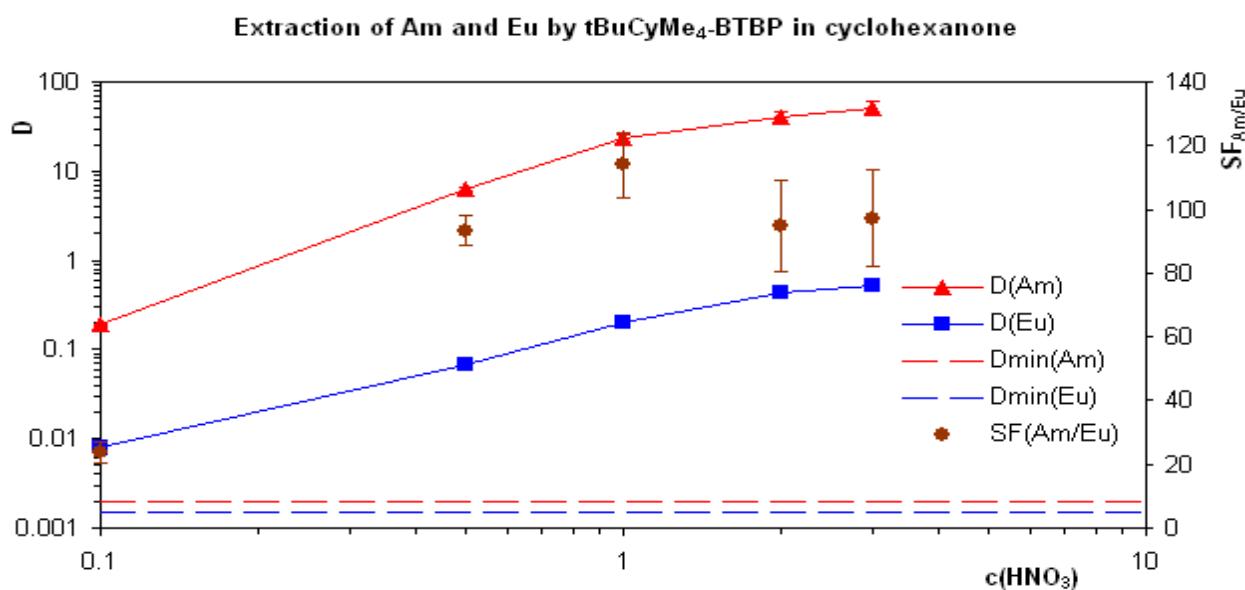
Contacting time: 6 hrs

results:

c(HNO ₃)	D(Am)			R(%)	D(Eu)			R(%)	SF(Am/Eu)		
	0.1	0.5	1		2	3	0.189	6.258	23.242	40.742	51.408
0.1	0.189	+/-	0.006	96.9	0.008	+/-	0.001	101.2	23.6	+/-	3.5
0.5	6.258	+/-	0.227	105.4	0.067	+/-	0.002	100.1	93.4	+/-	4.8
1	23.242	+/-	1.993	104.6	0.204	+/-	0.005	99.0	113.9	+/-	10.1
2	40.742	+/-	6.122	103.6	0.430	+/-	0.009	99.5	94.7	+/-	14.4
3	51.408	+/-	7.992	98.0	0.529	+/-	0.010	97.6	97.2	+/-	15.2

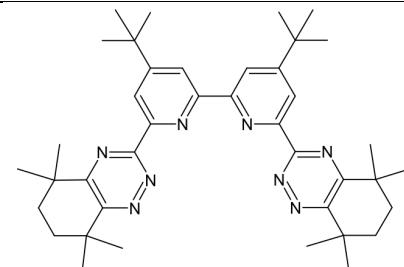
The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.



Screening Test Results ST90.

Compound name:	4,4'-Di-<i>tert</i>-butyl-6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine
Acronym:	tBu-CyMe ₄ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	17/08/2010 - 27/08/2010



Kinetics Tests (in cyclohexanone)

Organic phase composition:	5 mM tBuCyMe ₄ -BTBP in cyclohexanone
Aqueous phase composition:	a) 0.2 M HNO ₃ b) 2 M HNO ₃
Phase volumes:	800 µL
Temperature:	ambient (cca 22°C); not thermostatted
Shaking device:	GFL 3005 orbital shaker (Germany); 250 mot/min
Contacting time:	2 - 360 min

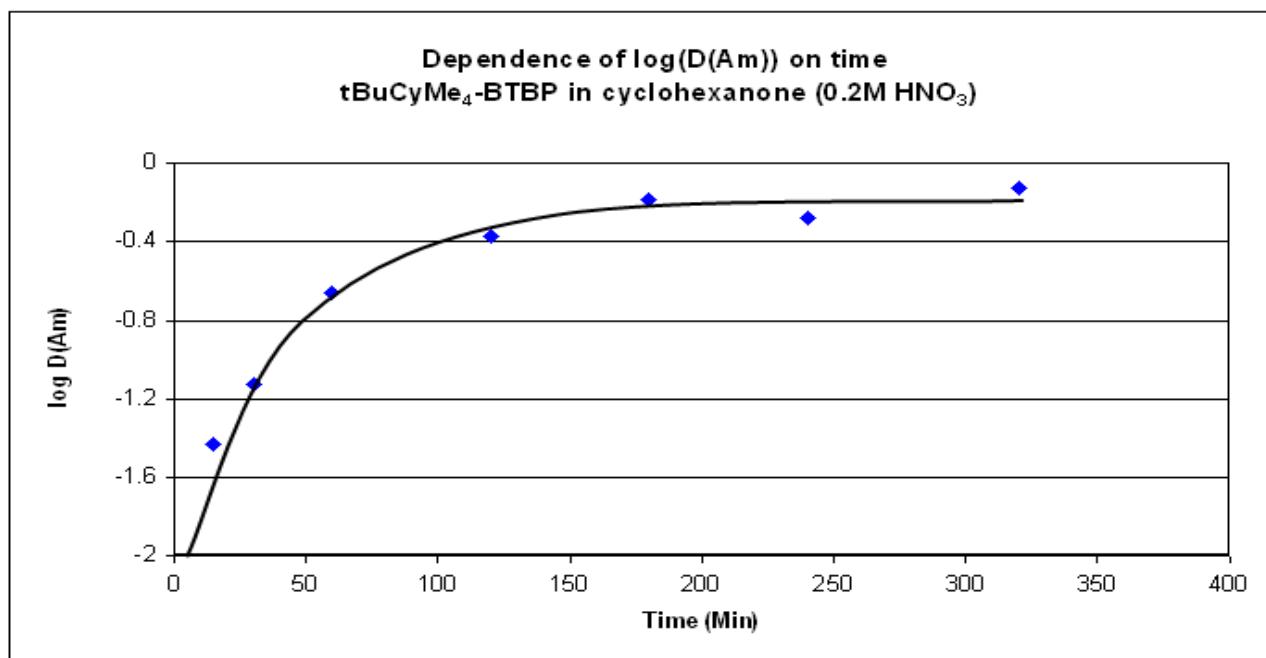
Results:

a) tBu-CyMe₄-BTBP in cyclohexanone and 0.2M HNO₃

Time (min)	D (Am)			R (%)	Time (min)	D (Am)			R (%)
	15	30	60			180	240	320	
0.037	+/-	0.002	99.3	99.3	180	0.657	+/-	0.017	104.2
0.075	+/-	0.004	104.1	104.1	240	0.528	+/-	0.018	97.7
0.220	+/-	0.008	98.3	98.3	320	0.755	+/-	0.022	99.8
0.426	+/-	0.012	101.3						

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.

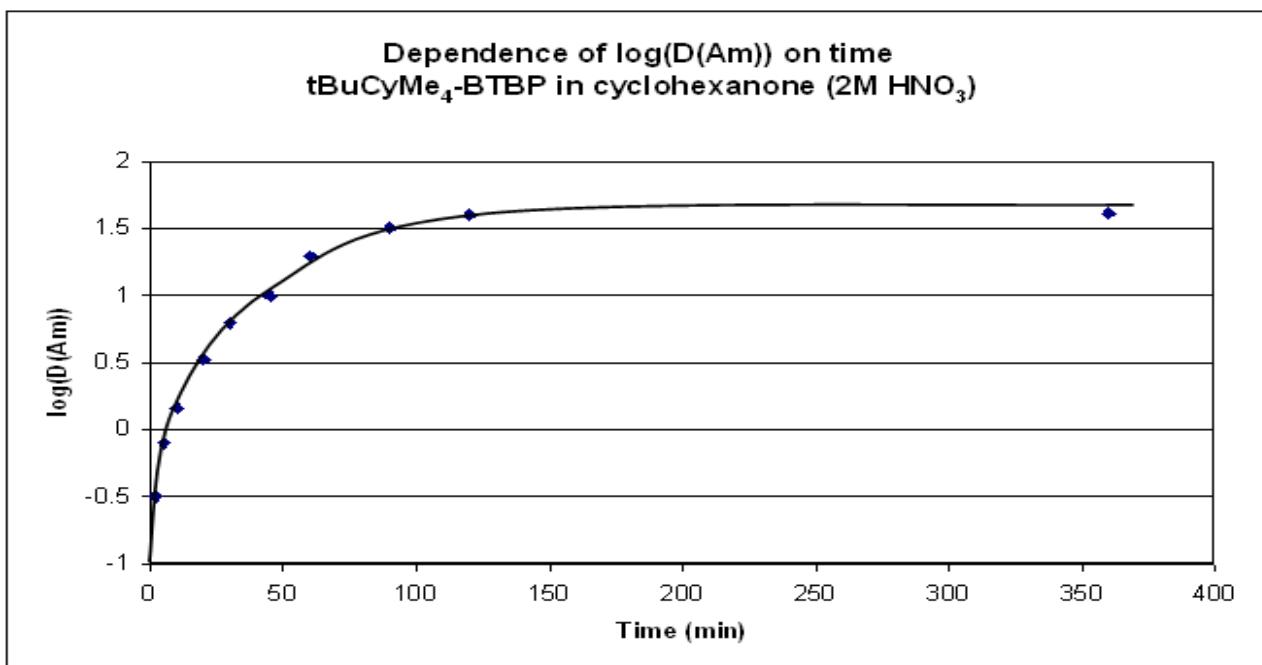


b) tBu-CyMe₄-BTBP in cyclohexanone and 2M HNO₃

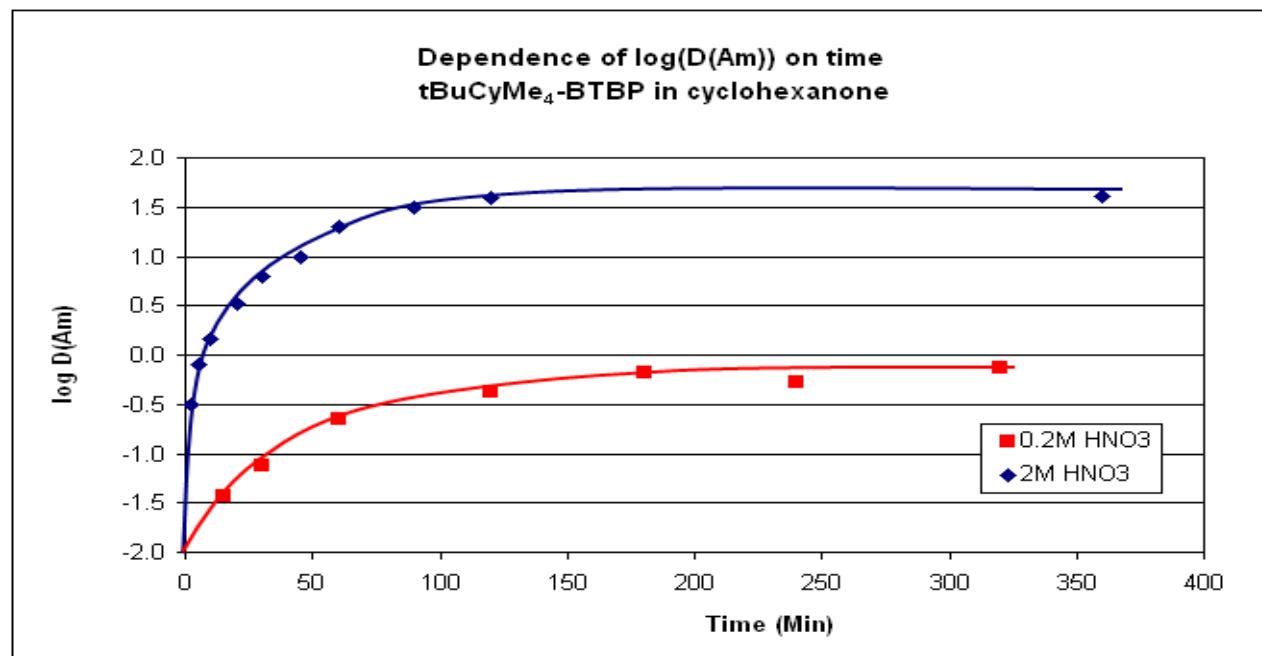
Time (min)	D (Am)			R (%)	Time (min)	D (Am)			R (%)
2	0,316	+/-	0,010	97,6	45	9,950	+/-	0,280	97,0
5	0,796	+/-	0,021	102,5	60	19,661	+/-	0,652	99,0
10	1,442	+/-	0,038	102,8	90	31,836	+/-	1,376	102,2
20	3,331	+/-	0,120	99,5	120	39,829	+/-	2,370	102,6
30	6,230	+/-	0,277	103,5	360	40,742	+/-	6,122	103,6

The errors given are 1 sigma and they include counting statistics, only.

The limit of detection has been calculated for 90% probability and it is based on counting statistics only, again.



Comparison:



Screening Test Results ST91.

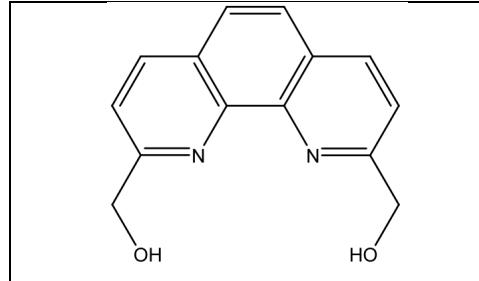
Compound name: 2,9-bis(hydroxymethyl)-1,10-phenanthroline

Acronym: Phen-dialcohol

Received from: POLIMI

Tested by: POLIMI

Date tested: 22/12/2010



Organic phase composition: 0.2 mol/LTODGA + 5% (vol.) 1-octanol in kerosene

Aqueous phase composition: $^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (4.5 kBq/mL each) in HNO_3
with or without 0.15 mol/L PHEN-dialcohol

Phase volumes: 500 μL

Temperature: 22°C

Shaking device: orbital shaker, 1000/min

Contacting time: 60 min

Results

$0.02 \text{ M} < \text{Solubility} < 0.16 \text{ M}$

Results

$$[\text{PHEN-dialcohol}] = 0$$

Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.1 mol/L HNO_3	9.07	62.13	6.66	
0.5 mol/L HNO_3	54.13	364.33	6.73	
1 mol/L HNO_3	398	1039	2.6	

$$[\text{PHEN-dialcohol}] = 0.15 \text{ mol/L}$$

Aq. Phase	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.1 mol/L HNO_3	0.001	0.003	5.22	
0.5 mol/L HNO_3	0.935	23.2	24.8	
1 mol/L HNO_3	23.5	289	12.3	

Screening Test Results ST92.

Compound name:	N^2,N^9 -bis(1,3-dihydroxy-2-(hydroxymethyl)propan-2-yl)-1,10-phenanthroline-2,9-dicarboxamide
Acronym:	PHEN-6OH
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	01/02/2011

Organic phase composition:

see Table 1

Aqueous phase composition:

$^{241}\text{Am(III)} + ^{152}\text{Eu(III)}$ (4.5 kBq/mL each) + PHEN-6OH 0,01 M + NH_4NO_3 0.5 M

Phase volumes:

500 μL

Temperature: 22°C; thermostatted:

no

Shaking device:

orbital shaker, 1000/min

Contacting time:

60 min

Results

Solubility

< 0.01 M (but extraction tests at 0.01 M)

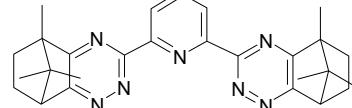
Table 1. Extraction data for the complexing agent PHEN-6OH

	[HNO ₃] = 1 M ^a	[HNO ₃] = 2 M ^a	[HNO ₃] = 3 M ^a	[HNO ₃] = 4 M ^a	
Sample A ^b	>1000				D-Eu
	443				D-Am
	-				SF _{Eu/Am}
Sample B ^c	64,4	195	741	745	D-Eu
	1,99	3,44	62,9	124	D-Am
	32,3	56,8	11,8	5,98	SF _{Eu/Am}
Sample C ^d	34,3	366			D-Eu
	0,818	16,4			D-Am
	41,9	22,3			SF _{Eu/Am}
Blank ^e	168	582	>1000	>1000	D-Eu
	23,6	115	409	859	D-Am
	7,14	5,05	-	-	SF _{Eu/Am}

^a aqueous solution of HNO₃ and 0.5 M NH₄NO₃ / ^b org: TODGA 0,2 M in kerosene/1-octanol 95/5; aq: aqueous solution, with 0.025 M PHEN-6OH / ^c org: TODGA 0,05 M in kerosene/1-octanol 95/5; aq: aqueous solution with 0.025 M PHEN-6OH / ^d org: TODGA 0,05 M in kerosene/1-octanol 95/5; aq: aqueous solution with 0.01 M PHEN-6OH / ^e org: TODGA 0,05 M in kerosene/1-octanol 95/5; aq: aqueous solution without PHEN-6OH

Screening Test Results ST93.

Compound name:	Bis-2,6-(5,6,7,8-tetrahydro-5,9,9-trimethyl-5,8-methano-1,2,4-benzotriazin-3-yl)pyridine
Acronym:	CA-BTP
Received from:	KIT-INE
Tested by:	KIT-INE
Date tested:	2009



Organic phase composition: 50 mmol/L CA-BTP in 1-octanol

Aqueous phase composition: $^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (1 kBq/mL each) in HNO_3

Phase volumes: 500 μL each

Temperature: 20°C

Shaking device: Orbital shaker, 300/min

Contacting time: 30 min

Results

Solubility:

> 0.2 mol/L in 1-octanol

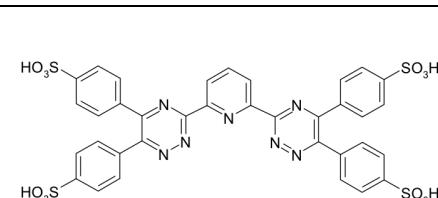
Precipitation for < 2 mol/L HNO_3

Distribution ratios:

$[\text{HNO}_3]$	D values		SF Am/Eu	Comments
	Am-241	Eu-152		
0.1	0.10	2.0e-3	50	
0.3	0.47	6.5e-3	72	
0.5	0.95	0.016	59	
0.7	1.4	0.022	64	
1.0	2.7	0.035	77	
1.5	2.3	0.0305	75	
2.0	1.8	0.025	72	
3.0	0.95	0.014	68	precipitation

Screening Test Results ST94.

Compound name:	2,6-bis(5,6-di(sulphophenyl)-1,2,4-triazin-3-yl)pyridine
Acronym:	SO ₃ -Ph-BTP
Received from:	KIT-INE
Tested by:	KIT-INE
Date tested:	09/2009



Organic phase composition: 0.2 mol/L TODGA + 5 % vol. 1-octanol in TPH

Aqueous phase composition: a) ²⁴¹Am(III) + ¹⁵²Eu(III) (1 kBq/mL each) in HNO₃
b) same as a) + 10 mmol/L SO₃-Ph-BTP

Phase volumes: 500 µL each

Temperature: 20°C

Shaking device: Orbital shaker, 2500/min

Contacting time: 15 min

Results

a) [SO₃-Ph-BTP] = 0

[HNO ₃]	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.089	3.27	23.4	7.16	
0.18	12.4	89.1	7.19	
0.44	82.7	389	4.7	
0.88	532			
1.76	2114			

b) [SO₃-Ph-BTP] = 10 mmol/L

[HNO ₃]	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.089	1.11e-3	1.19	1065	
0.18	0.0138	11.9	861	
0.44	0.346	177	511	
0.88	4.52	1042	230	
1.76	90.4			

Screening Test Results ST96.

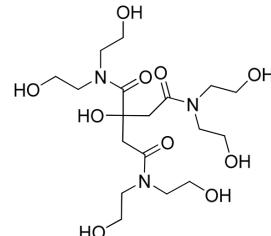
Compound name: 2-hydroxy-N¹, N¹, N², N², N³-hexakis(2-hydroxyethyl)propane-1,2,3-tricarboxamide

Acronym: CITAM

Received from: UNIPR

Tested by: POLIMI

Date tested: 15/09/2010



Organic phase composition:

TODGA 0.2 M in kerosene/1-Octanol 95/5 vol.

Aqueous phase composition:

²⁴¹Am(III) + ¹⁵²Eu(III) (4.5 kBq/mL each) + CITAM 0.1 M + NH₄NO₃ 0.5 M,

Phase volumes:

500 µL

Temperature: 22°C; thermostatted:

no

Shaking device: which one? frequency?

orbital shaker, 1000/min

Contacting time:

60 min

pH=3 (obtained by partial neutralization of 0.1 M HNO₃ with NaOH)

Results

Solubility

> 0.1 M (but extraction tests at 0.1 M)

a) [CITAM] = 0

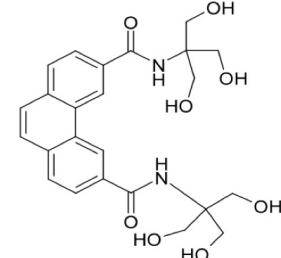
	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
pH=3	24.3	157	6.46	pH=3 ⇌ obtained by partial neutralization of 0.1 M HNO ₃ with NaOH
pH=2	25.7	166	6.3	0.01 M HNO ₃
pH=1	32.4	196	6.05	0.1 M HNO ₃

b) [CITAM] = 0.1 mol/L

	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
pH=3	0.539	2.05	3.81	pH=3 ⇌ obtained by partial neutralization of 0.1 M HNO ₃ with NaOH
pH=2	0.947	3.44	3.63	0.01 M HNO ₃
pH=1	7.66	11.3	1.48	0.1 M HNO ₃

Screening Test Results ST97.

Compound name:	N2,N9-bis(1,3-dihydroxy-2-(hydroxymethyl)propan-2-yl)-1,10-phenanthroline-2,9-dicarboxamide
Acronym:	Phen-6OH
Received from:	UNIPR
Tested by:	POLIMI
Date tested:	10/03/2011



Organic phase composition:

see Table 1

Aqueous phase composition:

$^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ (4.5 kBq/mL each) + phen-6OH 0,01 M + NH_4NO_3 0.5 M

Phase volumes:

500 μL

Temperature: 22°C; thermostatted:

no

Shaking device: which one? frequency?

orbital shaker, 1000/min

Contacting time:

60 min

Results

Solubility

< 0.1 M

Table 1. Extraction data for the complexing agent PHEN-6OH

	[HNO_3] = 2 M ^a	
Sample A ^b	197	D-Eu
	2.31	D-Am
	85.3	SF _{Eu/Am}
Sample B ^c	145	D-Eu
	1.34	D-Am
	108	SF _{Eu/Am}
Blank ^d	582	D-Eu
	115	D-Am
	5,05	SF _{Eu/Am}

^a aqueous solution of HNO_3 and 0.5 M NH_4NO_3

^b org: TODGA 0,05 in kerosene/1-octanol 95/5; aq: aqueous solution, with 0.04 M PHEN-6OH

^c org: TODGA 0,05 M in kerosene/1-octanol 95/5; aq: aqueous solution with 0.07 M PHEN-6OH

^d org: TODGA 0,05 M in kerosene/1-octanol 95/5; aq: aqueous solution without PHEN-6OH

Screening Test Results ST99.

Compound name: Pyrazine-2,6-diyldiphosphonic acid

Acronym: TWE-38

Received from: TWENTE

Tested by: FZJ

Date tested: 12/09/2011



Organic phase composition: 0.2M TODGA + 5%vol 1-Octanol in TPH

Aqueous phase composition: 0.1M TWE-38 + 10µL tracers (^{241}Am , ^{152}Eu) + 0.5M NH_4NO_3 , initial pH = 1 – 4

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min (Alublock thermostated 22°C)

No ligand

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH
	NH_4NO_3 [mol/L]	init. pH	Complexant		Am-241	Eu-152		
M524	0.5	1.00	-	yes	34.3	246.6	7.2	0.94
M525	0.5	2.00	-	yes	41.0	256.9	6.3	1.94
M526	0.5	3.00	-	yes	60.1	273.0	4.5	2.58
M535	0.5	4.01	-	yes	75.6	323.7	4.3	2.72

0.1 mol/L of the TWE-38 in the aqueous phase

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152	
JA170	0.5	1.00	TWE-38	yes	0.0005	0.0023	4.6	0.99
JA171	0.5	2.01	TWE-38	yes	0.0001	0.0008	9.9	2.01
JA172	0.5	3.00	TWE-38	yes	0.0003	0.0007	2.2	2.94
JA173	0.5	3.99	TWE-38	yes	0.0004	0.0004	1.0	3.84

Screening Test Results ST100.

Compound name:	Sodium Hydrogen(6-(morpholine-4-carbonyl)pyrazin-2-yl)phosphonate
Acronym:	TWE-39
Received from:	TWENTE
Tested by:	TWE-39
Date tested:	13/09/2011

Organic phase composition: 0.2M TODGA + 5%vol 1-Octanol in TPH

Aqueous phase composition: 0.1M TWE-39 + 10µL tracers (²⁴¹Am, ¹⁵²Eu) + 0.5M NH₄NO₃, initial pH = 1 – 4

Phase volumes: 500 µL

Temperature: 22°C; thermostated: yes

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200rpm

Contacting time: 60 min (Alublock thermostated 22°C)

No ligand

Sample	Aq. Phase			Tracer yes/no	D-values		SF Eu/Am	Final pH
	NH ₄ NO ₃ [mol/L]	init. pH	Complexant		Am-241	Eu-152		
M524	0.5	1.00	-	yes	34.3	246.6	7.2	0.94
M525	0.5	2.00	-	yes	41.0	256.9	6.3	1.94
M526	0.5	3.00	-	yes	60.1	273.0	4.5	2.58
M535	0.5	4.01	-	yes	75.6	323.7	4.3	2.72

0.1 mol/L of the ligand

Sample	Aq. Phase			Tracer yes/no	D-values		SF Eu/Am	Final pH
	NH ₄ NO ₃ [mol/L]	init. pH	Complexant		Am-241	Eu-152		
JA174	0.5	1.01	TWE-39	yes	10.804	114.398	10.6	1.02
JA175	0.5	2.01	TWE-39	yes	0.629	8.670	13.8	2.05
JA176	0.5	3.01	TWE-39	yes	0.149	1.845	12.4	2.97
JA177	0.5	4.01	TWE-39	yes	0.188	2.278	12.1	3.43

Screening Test Results ST101.

Compound name:	6,6'-Bis(5,6-di(sulphophenyl)-1,2,4-triazin-3-yl)-2,2'-bipyridine
Acronym:	SO ₃ -Ph-BTBP
Received from:	KIT-INE
Tested by:	KIT-INE
Date tested:	09/2009

Organic phase composition: 0.2 mol/L TODGA + 5 % vol. 1-octanol in TPH

Aqueous phase composition:
 a)) ²⁴¹Am(III) + ¹⁵²Eu(III) (1 kBq/mL each)
 + 10 mmol/L SO₃-Ph-BTBP in HNO₃
 b) ²⁴¹Am(III) + ²⁴⁴Cm(III) (1 kBq/mL each)
 + 18 mmol/L SO₃-Ph-BTBP in HNO₃

Phase volumes: 500 µL

Temperature: 20°C; temperature-controlled

Shaking device: Orbital shaker, 2500/min

Contacting time: 15 min

Results

a) Am(III) + Eu(III)

[HNO ₃]	D values		SF Eu/Am	Comments
	Am-241	Eu-152		
0.09	1.1·10 ⁻³	1.2	1100	
0.18	0.014	11.9	850	
0.44	0.35	180	510	
0.88	4.5	> 1000	> 220	
1.8	90	> 1000	> 11	

b) Am(III) + Cm(III)

[HNO ₃]	D values		SF Cm/Am	Comments
	Am-241	Cm-244		
0.1540	3.3e-3	0.011	3. 5	
0.2540	0.014	0.044	3.1	
0.3540	0.056	0.16	2.9	
0.5040	0.25	0.64	2.5	
0.7540	1.2	3.13	2.6	
1.0040	4.1	10.3	2.5	
1.5040	22	37	1.7	

Screening Test Results ST102.

Compound name:	6,6'-Bis(5,6,7,8-tetrahydro-5,9,9-trimethyl-5,8-methano-1,2,4-benzotriazin-3-yl)-2,2'-bipyridine
Acronym:	CA-BTBP
Received from:	KIT-INE
Tested by:	KIT-INE
Date tested:	4-9/8/2011

Organic phase composition: CA-BTBP in 1-octanol
 Aqueous phase composition: $^{241}\text{Am}(\text{III}) + ^{152}\text{Eu}(\text{III})$ in HNO_3
 Phase volumes: 500 μL
 Temperature: 20°C; thermostatted: yes
 Shaking device: 2500/min
 Contacting time: 20 min

Results

Solubility

40 mmol/L in 1-octanol

Precipitation for $[\text{HNO}_3] > 1 \text{ mol/L}$ or $[\text{BTBP}] > 20 \text{ mmol/L}$

Distribution ratios

$[\text{HNO}_3]$ mol/L	D values		SF Am/Eu	Comments
	Am-241	Eu-152		
0.3	0.56	$3.2 \cdot 10^{-3}$	180	
0.5	1.32	$6.6 \cdot 10^{-3}$	200	
0.7	2.29	0.011	210	
1.0	3.60	0.018	200	<i>10 mmol/L CA-BTBP</i>

$[\text{BTBP}]$ mmol/L	D values		SF Am/Eu	Comments
	Am-241	Eu-152		
5	0.38	$2.8 \cdot 10^{-3}$	140	
10	1.34	$7.1 \cdot 10^{-3}$	190	
20	5.02	0.023	210	
30	9.23	0.047	200	<i>0.5 mol/L HNO₃</i>
40	14.4	0.071	200	

[BTBP] mmol/L	D values		SF Am/Eu	Comments
	Am-241	Eu-152		
5	1.01	$6.5 \cdot 10^{-3}$	160	
10	4.27	0.019	220	
20	12.8	0.063	210	
30	22.8	0.120	190	<i>1.0 mol/L HNO₃</i>
40	34.4	0.202	170	

Screening Test Results ST103.

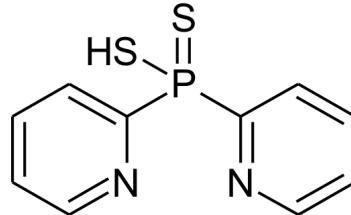
Compound name: Di 2-pyridyl dithiophosphinic acid

Acronym: TWE-40

Received from: TWENTE

Tested by: FZJ

Date tested: 26/04/2012



Organic phase composition: 0.2M TODGA + 5%vol Octanol in TPH

Aqueous phase composition: 0.1M TWE-40 + 10µL tracers (^{241}Am , ^{152}Eu , ^{244}Cm) + 0.5M NH_4NO_3 , initial pH = 1 – 4 and without pH-adjustment

Phase volumes: 500 µL

Temperature: 22 °C; thermostated: yes

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

Contacting time: 60 min

Remark: Although a precipitate was formed during pH-adjustment, solutions were used for extraction.

No complexant

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152		
M524	0.5	1.00	-	yes	34.3	246.6	7.2	0.94	60 min Alublock thermo- stated 22°C
M525	0.5	2.00	-	yes	41.0	256.9	6.3	1.94	
M526	0.5	3.00	-	yes	60.1	273.0	4.5	2.58	
M535	0.5	4.01	-	yes	75.6	323.7	4.3	2.72	

0.1 mol/L of the complexant - Gamma-results

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152		
JA279	0.5	1.03	TWE-40	yes	256.534	312.850	1.2	1.05	60 min Alublock thermo- stated 22°C
JA280	0.5	2.02	TWE-40	yes	88.320	618.040	7.0	2.04	
JA281	0.5	2.98	TWE-40	yes	11.654	101.291	8.7	2.95	
JA282	0.5	4.01	TWE-40	yes	4.351	38.376	8.8	3.90	
JA291	0.5	5.73	TWE-40	yes	37.895	36.656	1.0	5.03	

0.1 mol/L of the complexant - Alpha-results

Sample	Aq. Phase			Tracer yes/no	D-values		SF Cm/Am	Final pH	Mixing time
	NH ₄ NO ₃ [mol/L]	init. pH	Complexant		Am-241	Cm-244			
JA279	0.5	1.03	TWE-40	yes	38.158	44.271	1.2	1.05	60 min Alublock thermo- stated 22°C
JA280	0.5	2.02	TWE-40	yes	18.290	19.833	1.1	2.04	
JA281	0.5	2.98	TWE-40	yes	12.732	17.411	1.4	2.95	
JA282	0.5	4.01	TWE-40	yes	6.553	8.659	1.3	3.90	
JA291	0.5	5.73	TWE-40	yes	7.537	8.869	1.2	5.03	

Screening Test Results ST104.

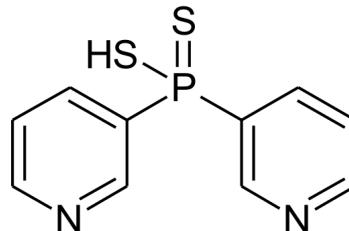
Compound name: Di 3-pyridyl dithiophosphinic acid

Acronym: TWE-41

Received from: TWENTE

Tested by: FZJ

Date tested: 03/05/2012



Organic phase composition: 0.2M TODGA + 5%vol Octanol in TPH

Aqueous phase composition: 0.1M TWE-41 + 10µL tracers (^{241}Am , ^{152}Eu , ^{244}Cm) + 0.5M NH_4NO_3 , initial pH = 1 – 4 and without pH-adjustment

Phase volumes: 500 µL

Temperature: 22 °C; thermostated: yes

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

Contacting time: 60 min

Remark: Although a precipitate was formed during pH-adjustment, solutions were used for extraction.

No complexant

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152		
M524	0.5	1.00	-	yes	34.3	246.6	7.2	0.94	60 min Alublock thermo- stated 22°C
M525	0.5	2.00	-	yes	41.0	256.9	6.3	1.94	
M526	0.5	3.00	-	yes	60.1	273.0	4.5	2.58	
M535	0.5	4.01	-	yes	75.6	323.7	4.3	2.72	

0.1 mol/L of the complexant - Gamma-results

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152		
JA287	0.5	1.02	TWE-41	yes	105.691	630.983	6.0	1.02	60 min Alublock thermo- stated 22°C
JA288	0.5	2.01	TWE-41	yes	62.123	286.683	4.6	2.00	
JA289	0.5	2.97	TWE-41	yes	29.792	103.008	3.5	2.84	
JA290	0.5	3.96	TWE-41	yes	38.316	65.352	1.7	3.82	
JA293	0.5	6.58	TWE-41	yes	4.531	3.474	0.8	5.20	

0.1 mol/L of the complexant - Alpha-results

Sample	Aq. Phase			Tracer yes/no	D-values		SF Cm/Am	Final pH	Mixing time
	NH ₄ NO ₃ [mol/L]	init. pH	Complexant		Am-241	Cm-244			
JA287	0.5	1.02	TWE-41	yes	15.495	17.606	1.1	1.02	60 min Alublock thermo- stated 22°C
JA288	0.5	2.01	TWE-41	yes	25.198	32.017	1.3	2.00	
JA289	0.5	2.97	TWE-41	yes	23.974	30.987	1.3	2.84	
JA290	0.5	3.96	TWE-41	yes	19.242	26.077	1.4	3.82	
JA293	0.5	6.58	TWE-41	yes	5.393	5.524	1.0	5.20	

Screening Test Results ST105.

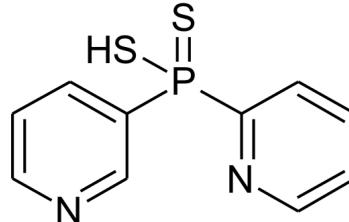
Compound name: 2-pyridyl(3-pyridyl) dithiophosphinic acid

Acronym: TWE-42

Received from: TWENTE

Tested by: FZJ

Date tested: 02/05/2012



Organic phase composition: 0.2M TODGA + 5%vol Octanol in TPH

Aqueous phase composition: 0.1M TWE-42 + 10µL tracers (^{241}Am , ^{152}Eu , ^{244}Cm) + 0.5M NH_4NO_3 , initial pH = 1 – 4 and without pH-adjustment

Phase volumes: 500 µL

Temperature: 22 °C; thermostated: yes

Shaking device: IKA Vibrax Orbital Shaker Model VXR, 2200 rpm

Contacting time: 60 min

Remark: Although a precipitate was formed during pH-adjustment, the solutions were used for extraction.

No complexant

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152		
M524	0.5	1.00	-	yes	34.3	246.6	7.2	0.94	60 min Alublock thermo- stated 22°C
M525	0.5	2.00	-	yes	41.0	256.9	6.3	1.94	
M526	0.5	3.00	-	yes	60.1	273.0	4.5	2.58	
M535	0.5	4.01	-	yes	75.6	323.7	4.3	2.72	

0.1 mol/L of the complexant - Gamma-results

Sample	Aq. Phase			Tracer	D-values		SF Eu/Am	Final pH	Mixing time
	NH_4NO_3 [mol/L]	init. pH	Complexant		yes/no	Am-241	Eu-152		
JA283	0.5	1.02	TWE-42	yes	125.673	1105.164	8.8	1.05	60 min Alublock thermo- stated 22°C
JA284	0.5	2.03	TWE-42	yes	55.114	254.577	4.6	2.17	
JA285	0.5	3.01	TWE-42	yes	12.691	57.643	4.5	3.14	
JA286	0.5	4.00	TWE-42	yes	11.437	21.015	1.8	4.01	
JA292	0.5	5.49	TWE-42	yes	10.527	4.903	0.5	5.20	

0.1 mol/L of the complexant - Alpha-results

Sample	Aq. Phase			Tracer yes/no	D-values		SF Cm/Am	Final pH	Mixing time
	NH ₄ NO ₃ [mol/L]	init. pH	Complexant		Am-241	Cm-244			
JA283	0.5	1.02	TWE-42	yes	46.642	78.801	1.7	1.05	60 min Alublock thermo- stated 22°C
JA284	0.5	2.03	TWE-42	yes	14.668	22.612	1.5	2.17	
JA285	0.5	3.01	TWE-42	yes	11.248	12.534	1.1	3.14	
JA286	0.5	4.00	TWE-42	yes	4.383	3.058	0.7	4.01	
JA292	0.5	5.49	TWE-42	yes	6.374	5.664	0.9	5.20	

Screening Test Results ST106.

Compound name:	Tetrasodium 3,3',3'',3'''-[3-(1,10-phenanthroline-2,9-diyl)-1,2,4-triazine-5,5,6,6-tetrayl]tetrabenzenesulfonate
Acronym:	(PhSO ₃ Na) ₂ -BTBP
Received from:	UREAD
Tested by:	CTU
Date tested:	28/05/2012 - 14/06/2012

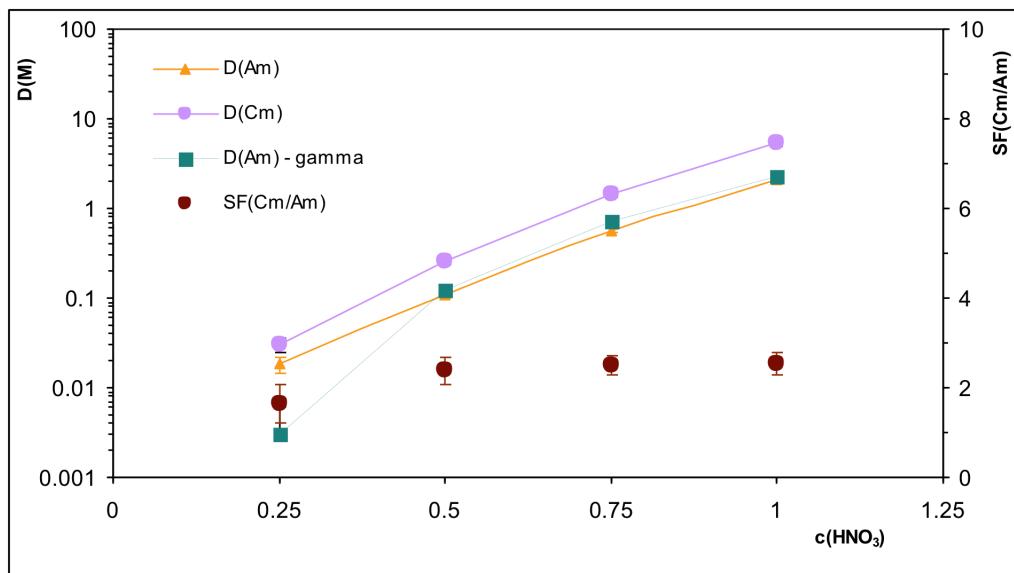
The chemical structure shows a central 1,2,4-triazine ring system substituted with two 1,10-phenanthroline-2,9-diyl groups at the 3 and 3' positions. Each phenanthroline group is further substituted with two sodium sulfonatobenzene groups at the 2 and 9 positions.

Organic phase : 0.2 M TODGA dissolved in 5 % n-octanol in kerosene

Solubility: Higher than 110 mM in 0.5 M HNO₃

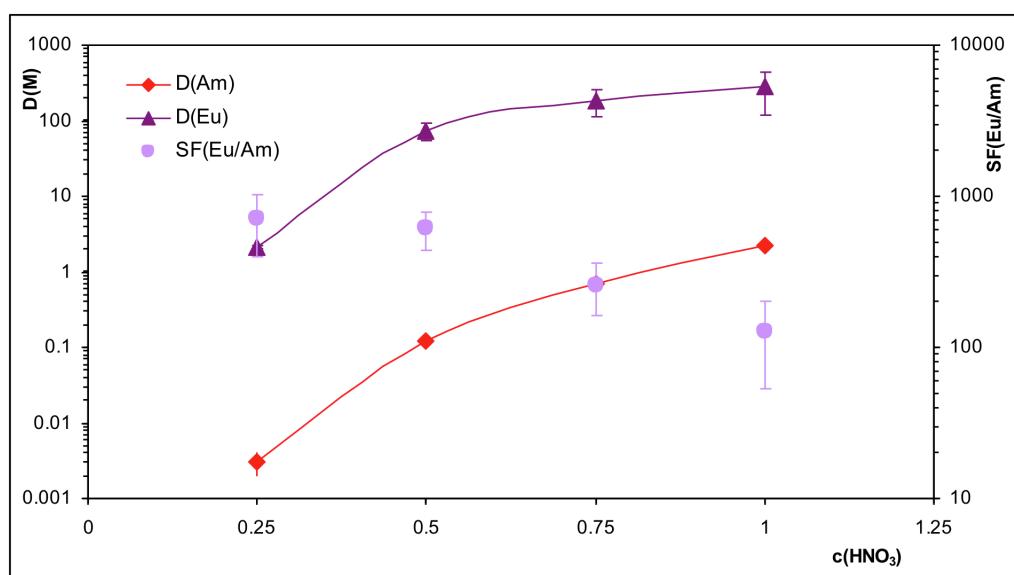
Extraction of Cm over Am

c(HNO ₃)		D(Am) - gamma			D(Am)			D(Cm)			SF(Cm/Am)		
initial	equilibrium												
0.28	0.28	0.003	+/-	0.001	0.018	+/-	0.004	0.030	+/-	0.005	1.6	+/-	0.4
0.50	0.53	0.121	+/-	0.009	0.110	+/-	0.011	0.26	+/-	0.02	2.4	+/-	0.3
0.77	0.78	0.71	+/-	0.03	0.57	+/-	0.03	1.4	+/-	0.1	2.5	+/-	0.2
1.04	1.08	2.23	+/-	0.06	2.1	+/-	0.1	5.3	+/-	0.4	2.5	+/-	0.2



Extraction of Eu over Am

c(HNO ₃)		D(Am)			D(Eu)			SF(Eu/Am)		
initial	equilibrium									
0.28	0.28	0.003	+/-	0.001	2.1	+/-	0.1	707	+/-	312
0.50	0.53	0.121	+/-	0.009	74	+/-	21	616	+/-	178
0.77	0.78	0.71	+/-	0.03	184	+/-	70	260	+/-	99
1.04	1.08	2.23	+/-	0.06	282	+/-	164	127	+/-	73



Screening Test Results ST107.

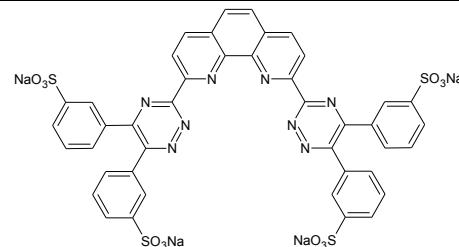
Compound name: Tetrasodium 3,3',3'',3'''-[3-(2,2'-bipyridine-6,6'-diyl)-1,2,4-triazine-5,5,6,6,-tetracyl]tetrabenzenesulfonate

Acronym: (PhSO₃Na)₂-BTPhen

Received from: UREAD

Tested by: CTU

Date tested: 13/06/2012 - 30/06/2012

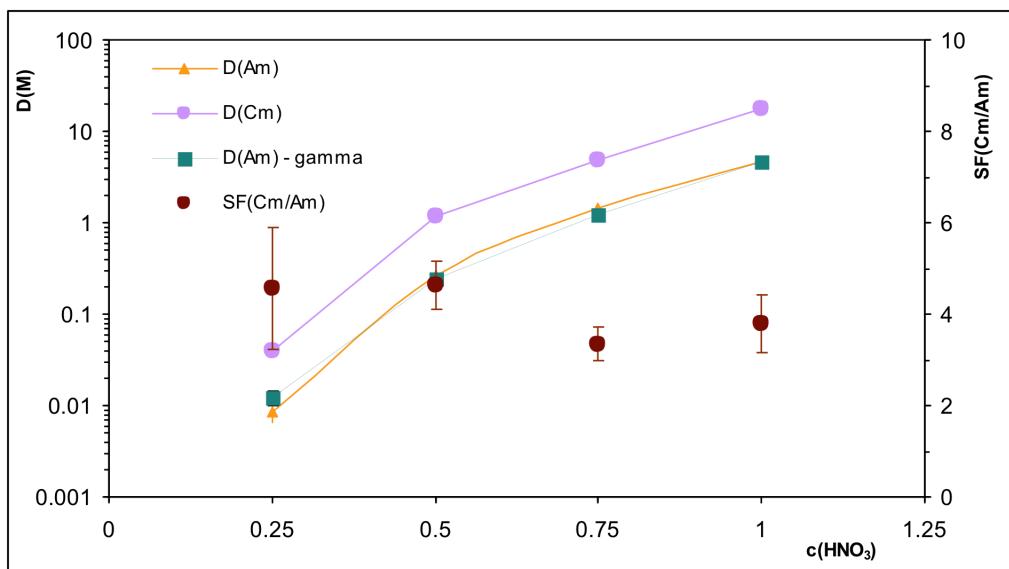


Organic phase : 0.2 M TODGA dissolved in 5 % n-octanol in kerosene

Solubility: Higher than 110 mM in 0.5 M HNO₃

Extraction of Cm over Am

c(HNO ₃)	D(Am) - gamma			D(Am)			D(Cm)			SF(Cm/Am)		
	initial	equilibrium										
0.28	0.29	0.012	+/- 0.003	0.009	+/- 0.002	0.039	+/- 0.006	4.6	+/- 1.3			
0.50	0.52	0.25	+/- 0.01	0.26	+/- 0.02	1.17	+/- 0.08	4.6	+/- 0.5			
0.77	0.82	1.22	+/- 0.03	1.4	+/- 0.1	4.8	+/- 0.4	3.3	+/- 0.4			
1.04	1.07	4.7	+/- 0.2	4.7	+/- 0.4	17.9	+/- 2.7	3.8	+/- 0.6			



Extraction of Eu over Am

c(HNO ₃)	D(Am)			D(Eu)			SF(Eu/Am)		
	initial	equilibrium							
0.28	0.29	0.012 +/- 0.003		5.8	+/- 0.2	482	+/- 110		
0.50	0.52	0.25 +/- 0.01		79	+/- 19	321	+/- 79		
0.77	0.82	1.22 +/- 0.03		169	+/- 65	138	+/- 54		
1.04	1.07	4.7 +/- 0.2		144	+/- 60	31	+/- 13		

