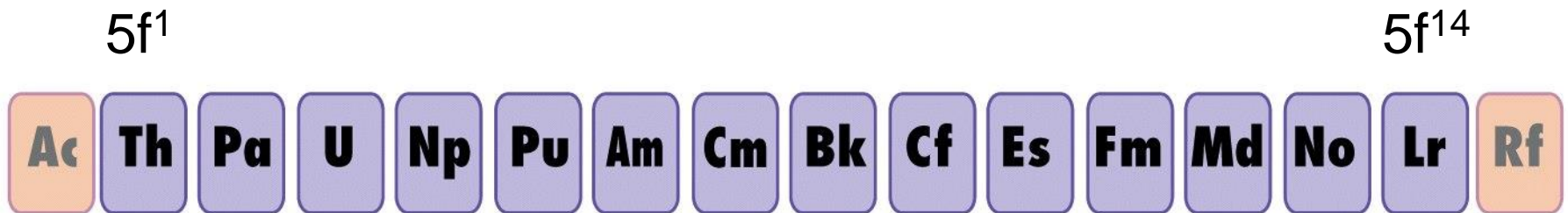


Attinidi



Attinide generico = An, 5fⁿ6d¹7s²

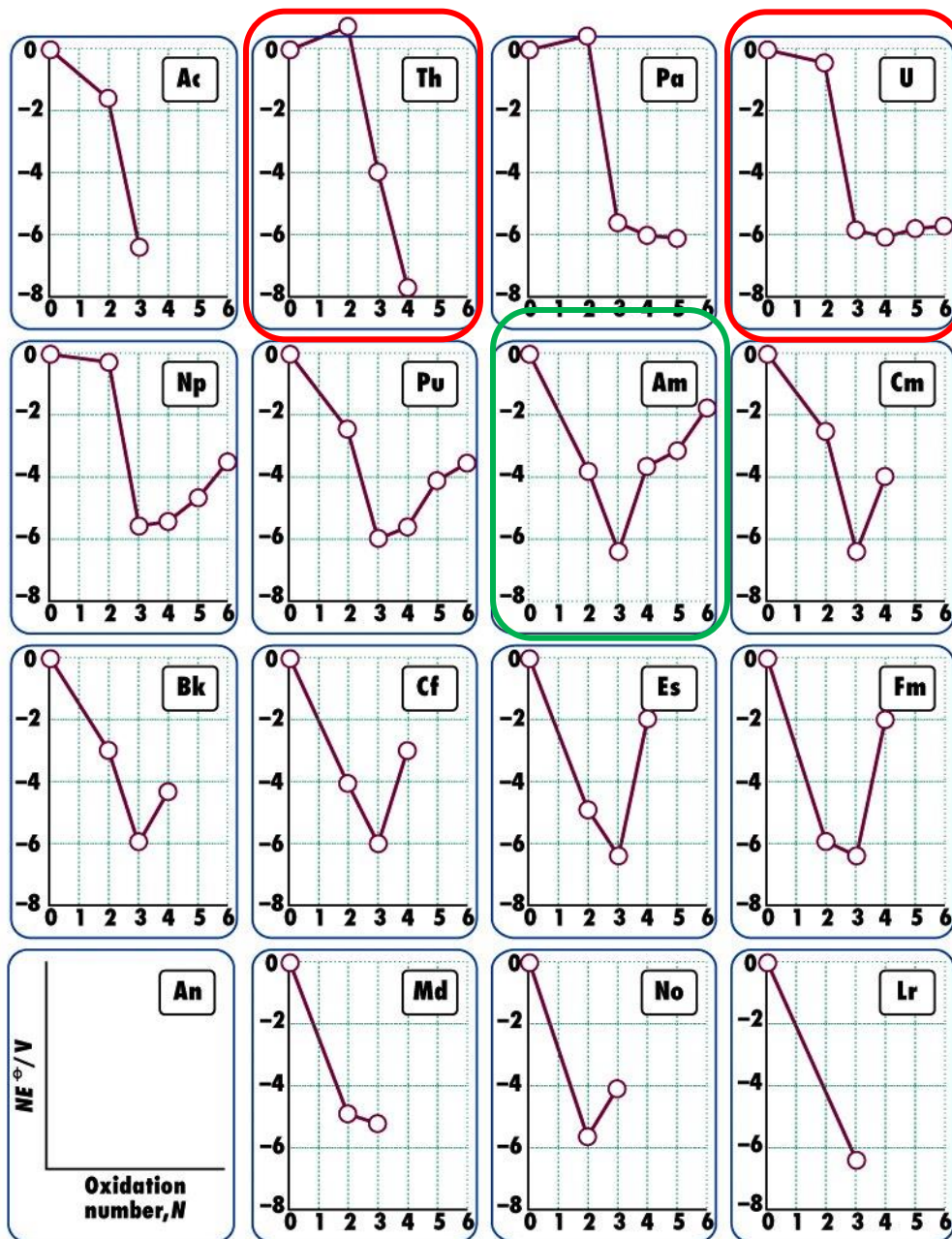
Table 22.1 Half-lives of the most stable actinoid isotopes

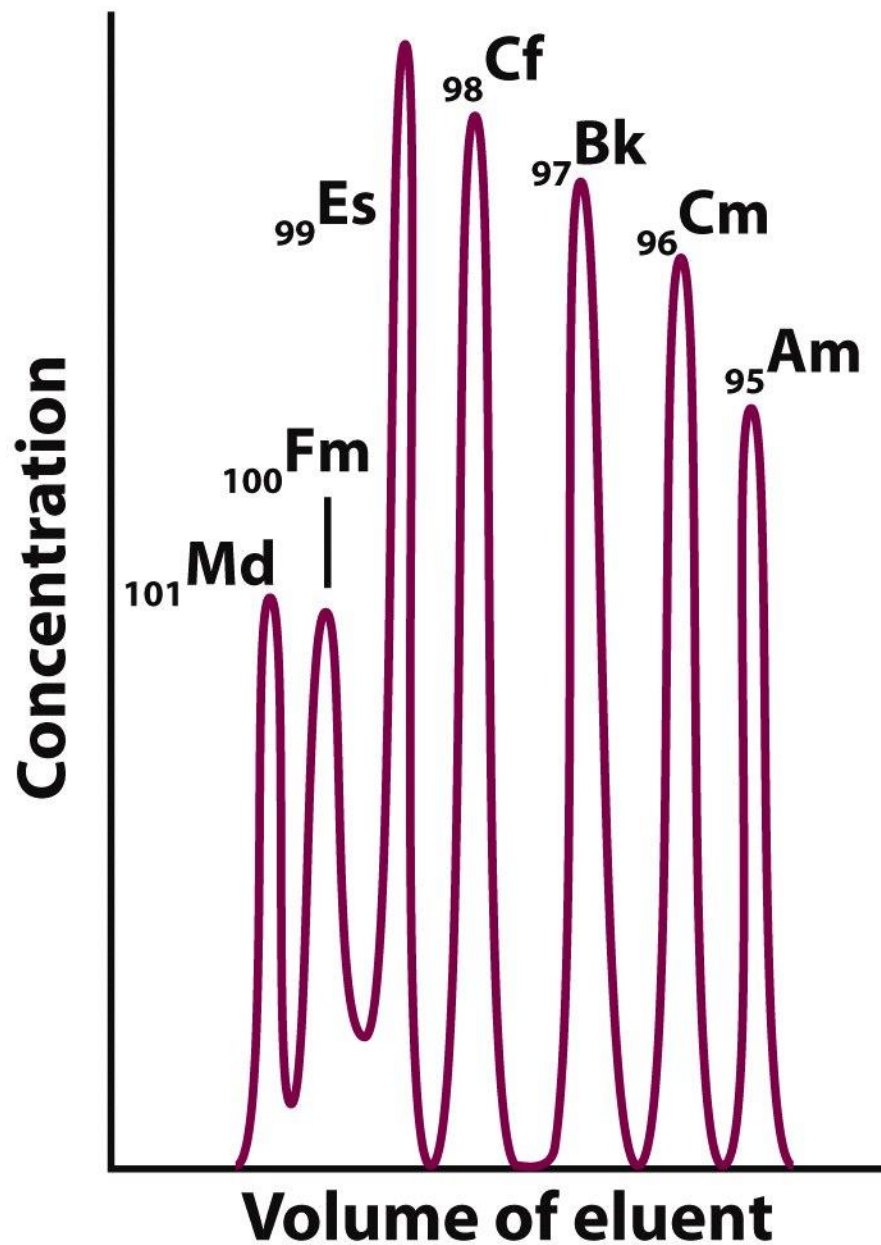
Z	Name	Symbol	Mass number	$t_{\frac{1}{2}}$
89	Actinium	Ac	227	21.8 years
90	Thorium	Th	232	1.41×10^{10} years
91	Protactinium	Pa	231	3.28×10^4 years
92	Uranium	U	238	4.47×10^9 years
93	Neptunium	Np	237	2.14×10^6 years
94	Plutonium	Pu	244	8.1×10^7 years
95	Americium	Am	243	7.38×10^3 years
96	Curium	Cm	247	1.6×10^7 years
97	Berkelium	Bk	247	1.38×10^3 years
98	Californium	Cf	251	900 years
99	Einsteinium	Es	252	460 days
100	Fermium	Fm	257	100 days
101	Mendelevium	Md	258	55 days
102	Nobelium	No	259	1.0 h
103	Lawrencium	Lr	260	3 min

ThSiO_4 *torite*

UO_2 *uranite*

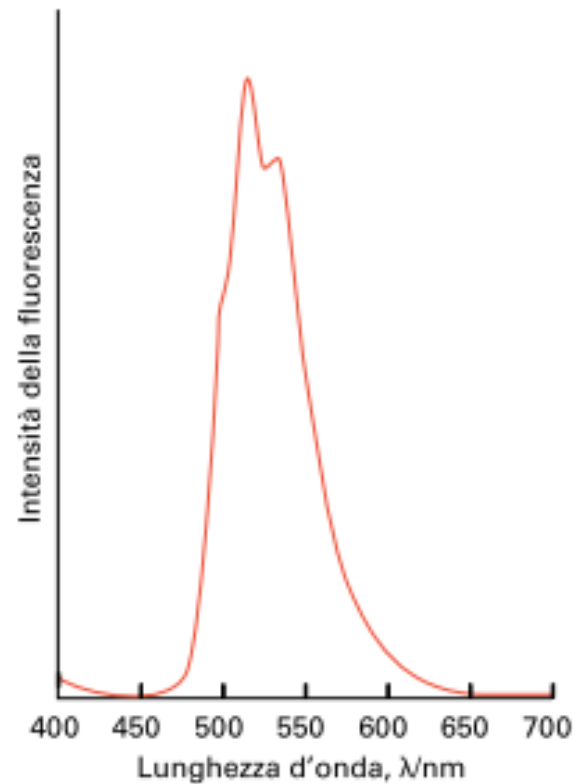
U_3O_8 *pechblenda*



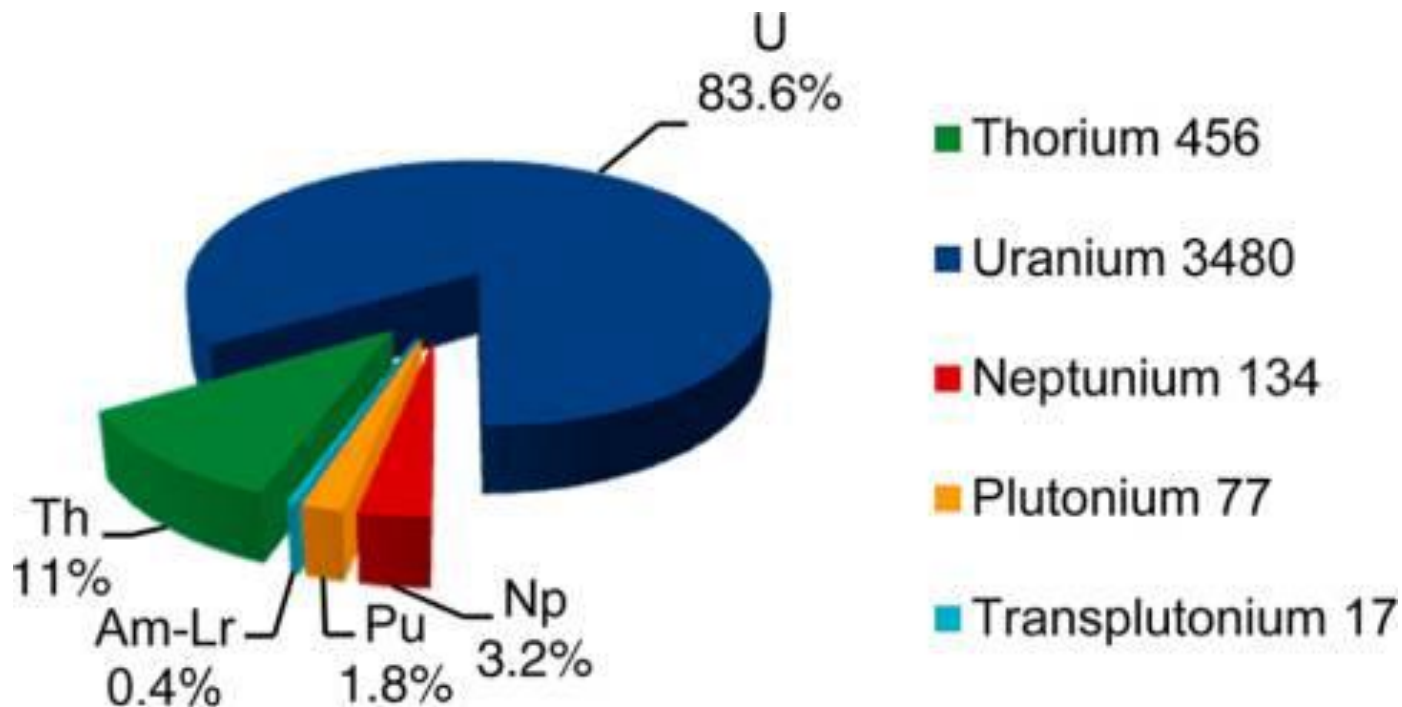


Eluizione degli ioni più pesanti degli attinidi da una colonna a scambio di cationi usando 2-idrossiisobutirrato di ammonio come eluente.

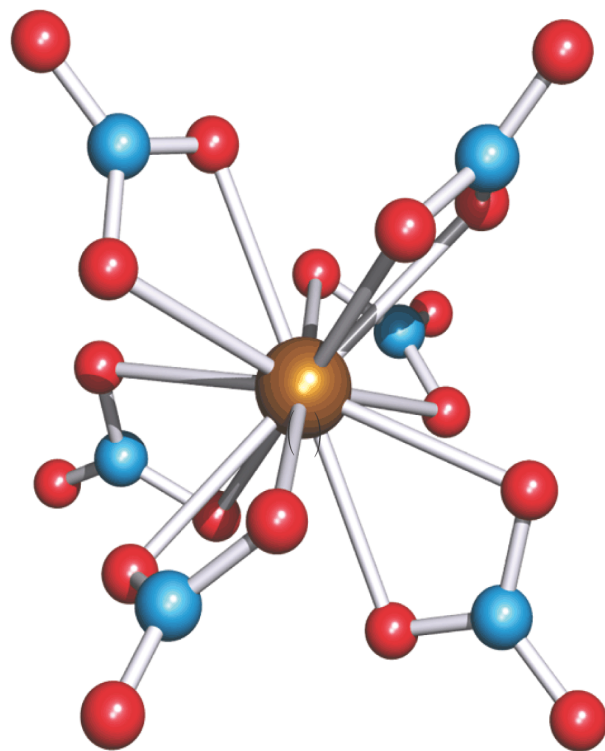
Spettro di fluorescenza dello ione uranile, UO_2^{2+} in acqua



Numerosità delle strutture note di complessi con attinidi (2012)



Cfr. Fe > 33.300, Cu > 41.600



Separazione dei radionuclidi trans-plutonici da uranio, plutonio e lantanidi di fissione

Longest-lived isotope	Half-life	Decay mode	Longest-lived isotope	Half-life	Decay mode
²²⁷ Ac	21.8 yr	β^-	²⁴⁷ Bk	1.4×10^3 yr	α, γ
²³² Th	1.4×10^{10} yr	α, γ	²⁵¹ Cf	9.0×10^2 yr	α, γ
²³¹ Pa	3.3×10^4 yr	α, γ	²⁵² Es	1.3 yr	α
²³⁸ U	4.5×10^9 yr	α, γ	²⁵⁷ Fm	100 d	α, γ
²³⁷ Np	2.1×10^6 yr	α, γ	²⁵⁸ Md	52 d	α
²⁴⁴ Pu	8.2×10^7 yr	α, γ	²⁵⁹ No	58 min	α
²⁴⁵ Am	7.4×10^5 yr	α, γ	²⁶² Lr	3 min	α
²⁴⁷ Cm	1.6×10^7 yr	α, γ			

Un reattore da 1GW produce ogni anno ca.30 tonnellate di combustibile nucleare esausto: $^{238}\text{U} + ^{235}\text{U} + ^{239}\text{Pu}$ (0.2 t) + Np, Am, Cm (0.02 t) + lantanidi di fissione +

Separazione dei radionuclidi trans-plutonici
da uranio, plutonio e lantanidi di fissione

PUREX (Plutonium/URanium EXtraction)

U(VI) + Pu(IV)

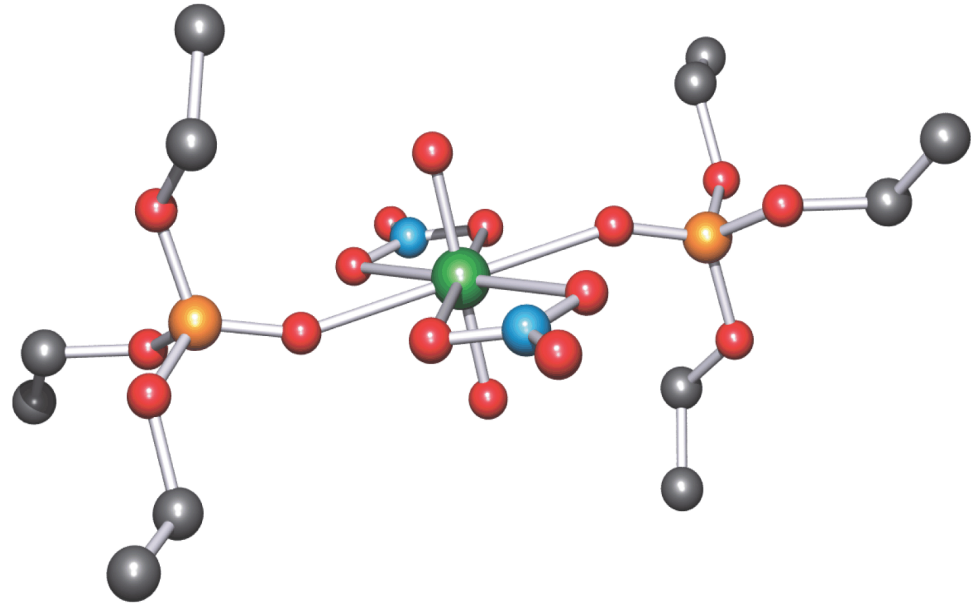
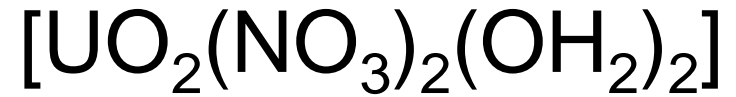
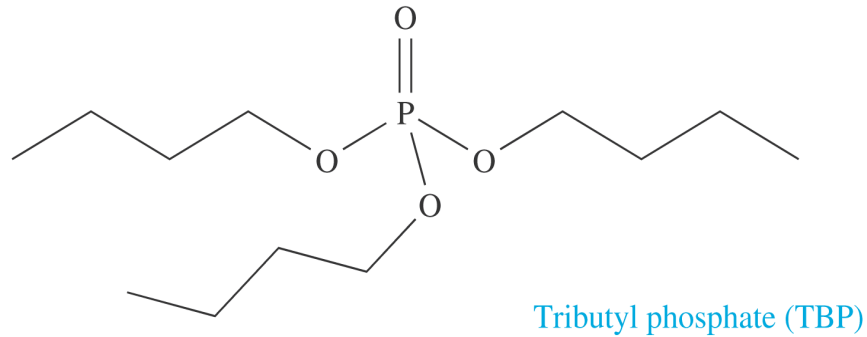
TRUEX (TRansUranic elements EXtraction)

Am(III) + Cm(III) + lantanidi di fissione

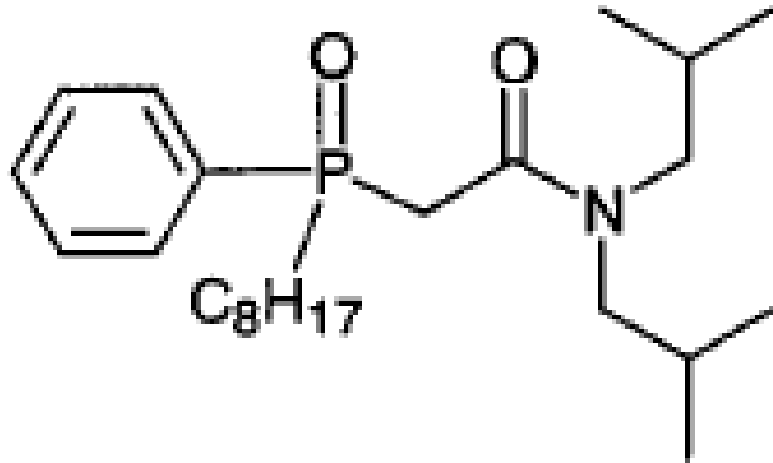
SANEX (Selective ActiNide EXtraction)

Am(III) + Cm(III)

TPB (processi PUREX e TRUEX)

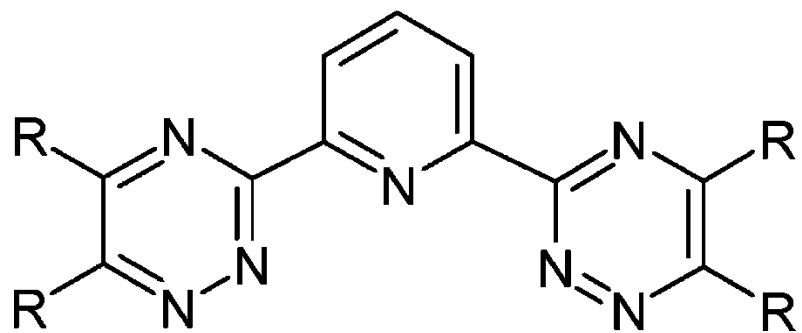


CMPO (processo TRUEX)

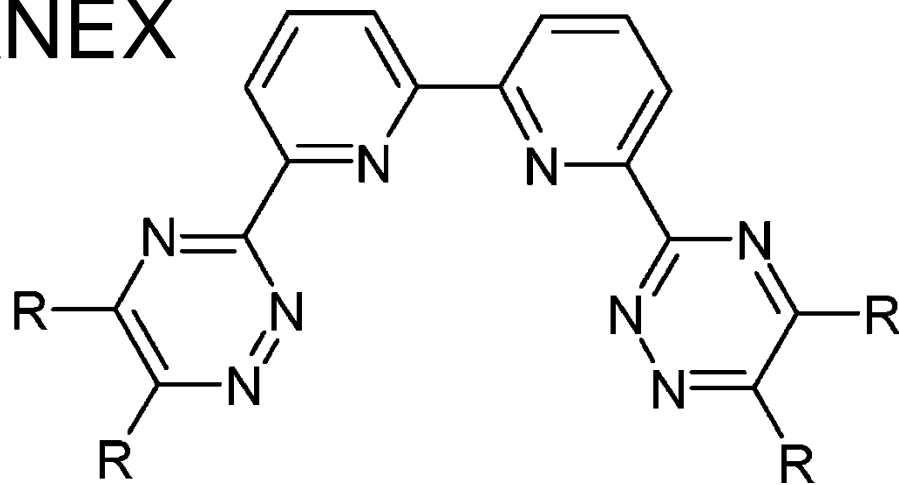


octyl(phenyl)-N,N-diisobutylcarbamoylmethylphosphine oxide

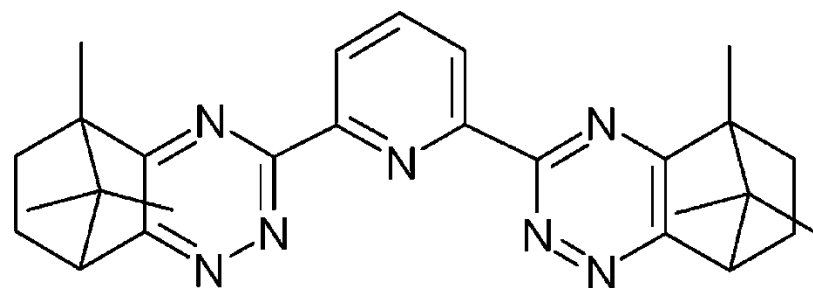
Leganti estrattori per SANEX



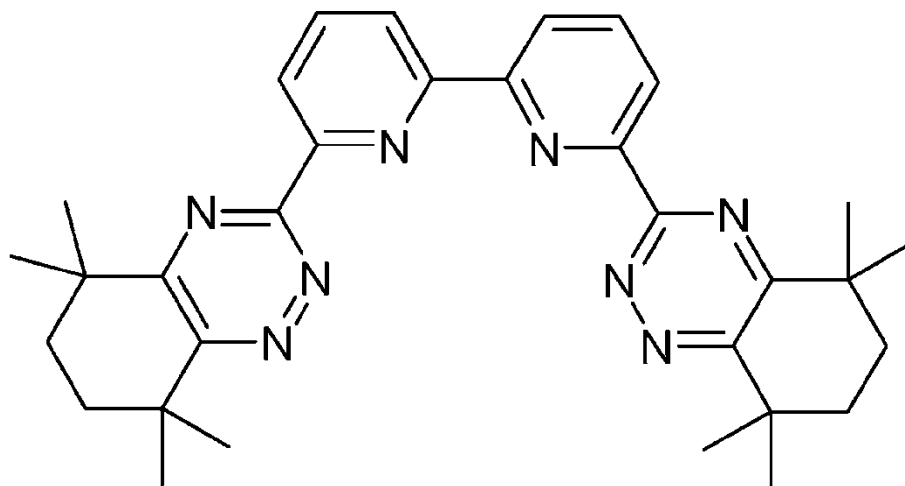
BTP



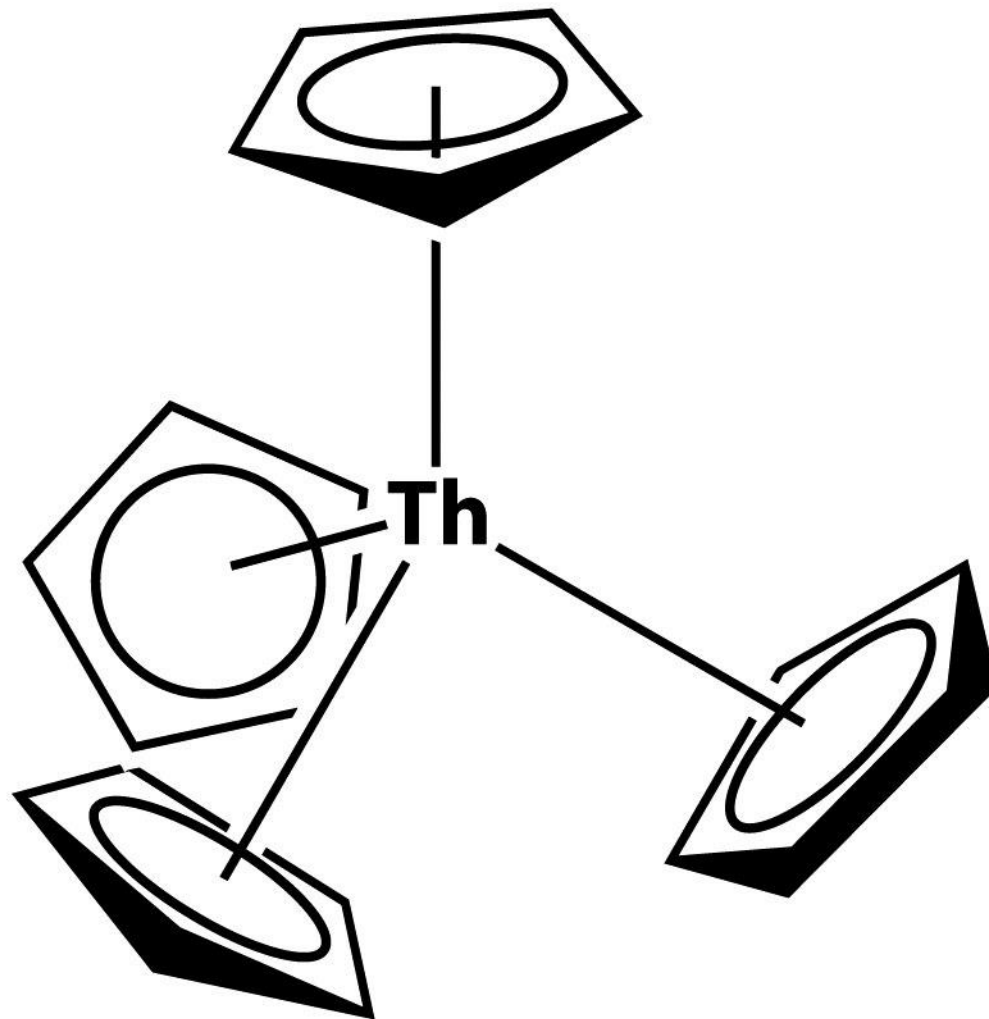
BTBP



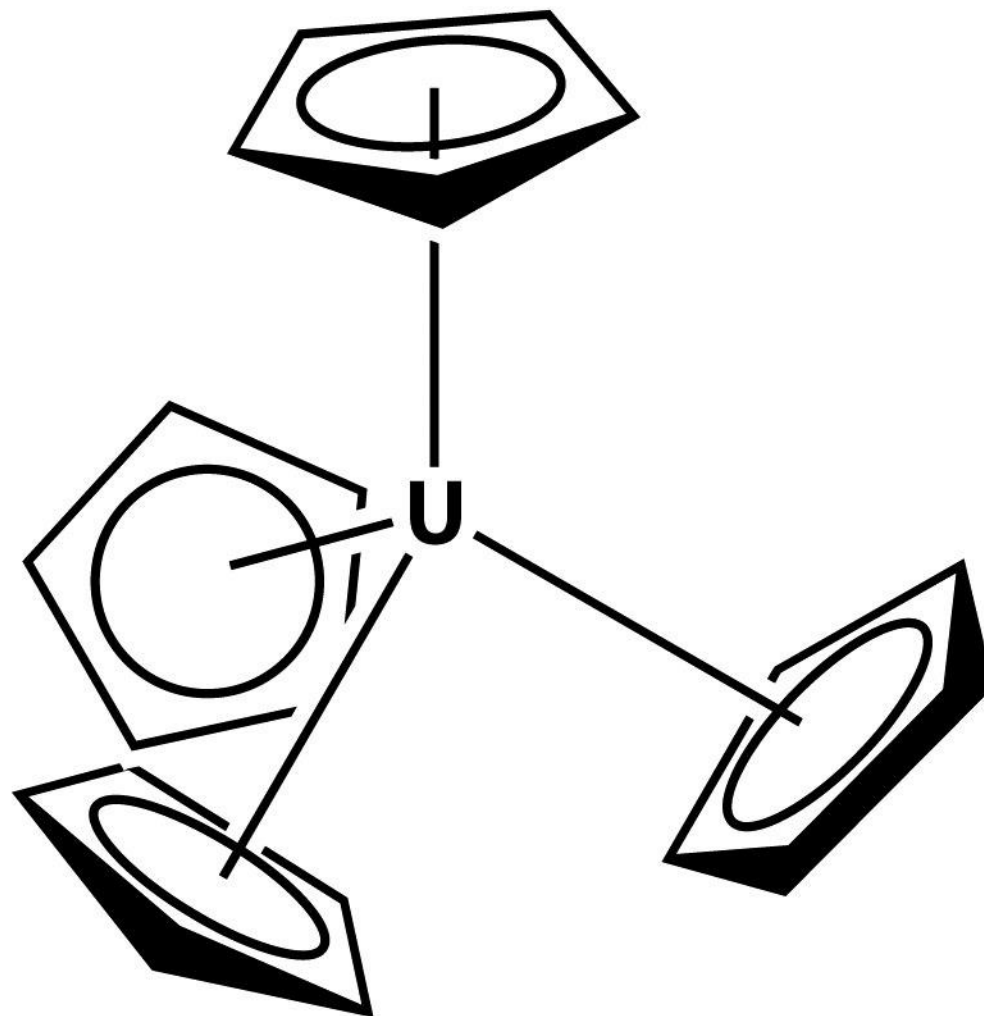
Ca-BTP



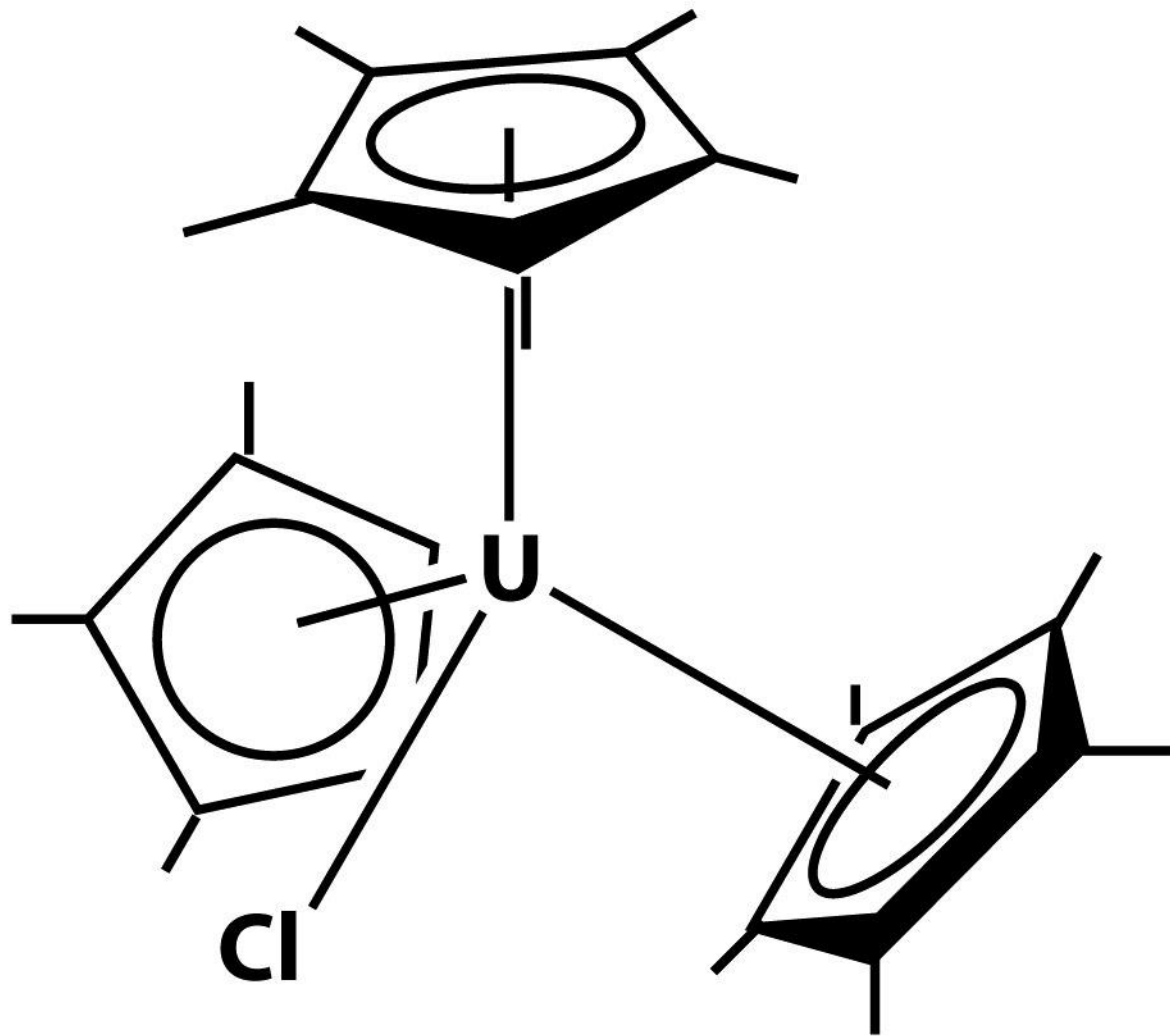
CyMe₄-BTBP

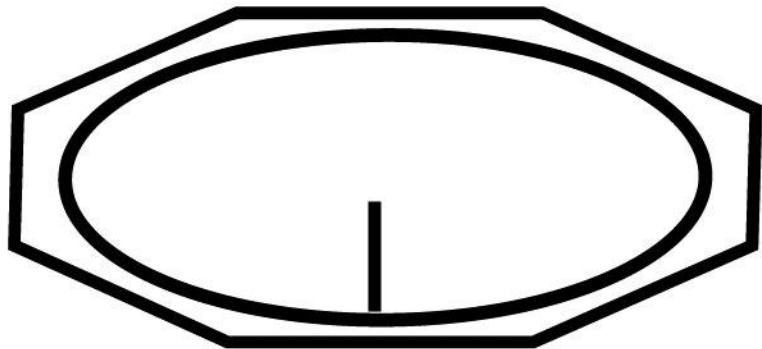


Th(Cp)₄

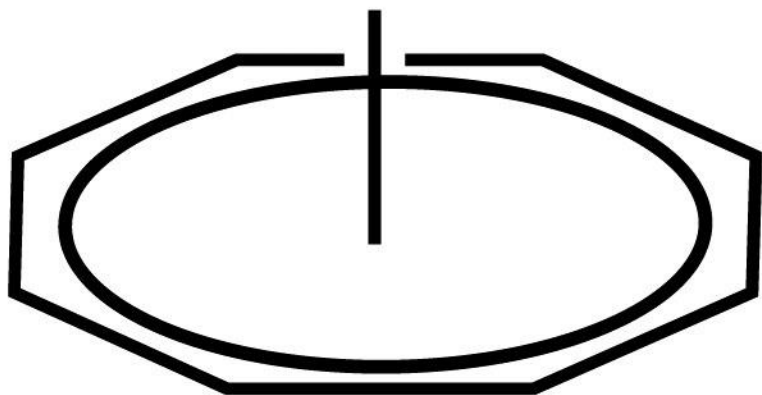


$U(Cp)_4$

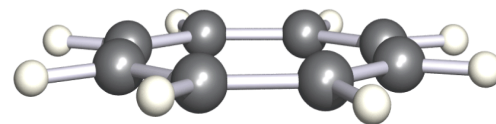
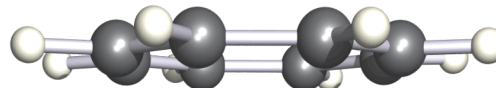


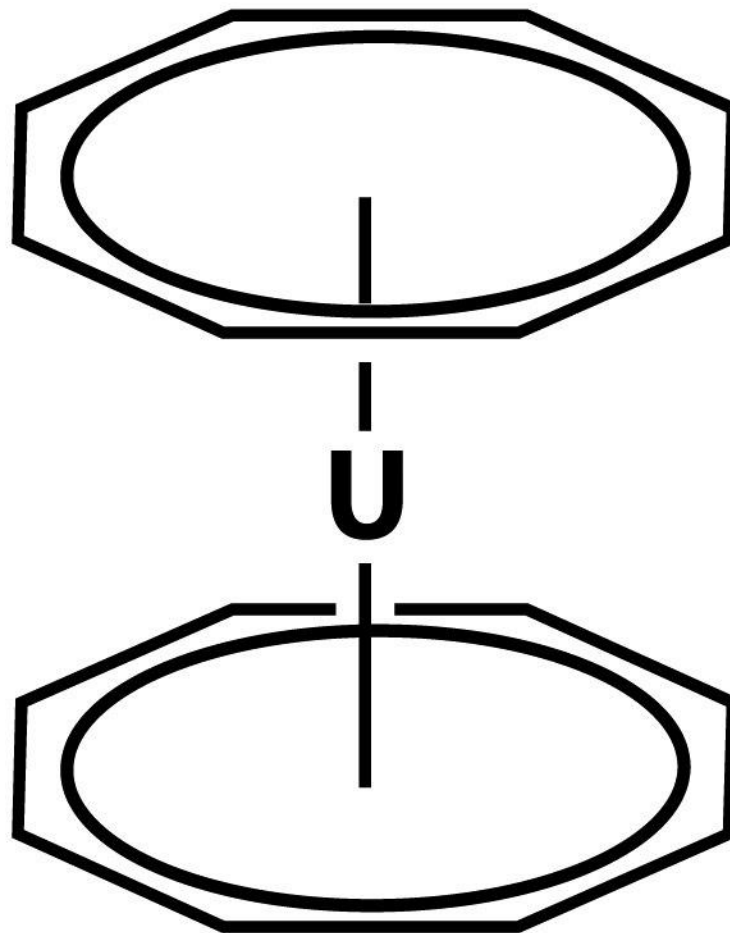


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Th



Torocene





Uranocene