{{Elementbox

|name=Uuo

|number=118

|symbol=Uuo

|left=[[Uus]]

|right=[[Uue]]

|above=[[氡|Rn]]

|below=(Uho)

|group=18

|period=7

|block=p

|appearance=

|atomic mass=[294]

|electron configuration=（預測）<nowiki>[</nowiki>[[氡|Rn]]<nowiki>]</nowiki> 5f<sup>14</sup> 6d<sup>10</sup> 7s<sup>2</sup> 7p<sup>6</sup><ref name=Nash>{{cite journal|title=Atomic and Molecular Properties of Elements 112, 114, and 118|first=Clinton S. |last=Nash|journal=Journal of Physical Chemistry A|year=2005|volume=109|issue=15|pages=3493–3500|doi=10.1021/jp050736o|accessdate=2008-01-18}}</ref>

|electrons per shell=（預測）2, 8, 18, 32, 32, 18, 8<ref name=Nash/>

|density gpcm3nrt=（預測）13.65<ref name="apsidium">{{citeweb|url=http://www.apsidium.com/elements/118.htm|title =Moskowium|publisher=Apsidium|accessdate=2008-01-18}}</ref>

|boiling point K=（推算）350±30<ref name=Nash/>

|boiling point C=80±30

|boiling point F=170±50

|critical point K=（推算）439<ref name=Eichler/>

|critical point MPa=6.8<ref name=Eichler>{{citation|title=Thermochemical Properties of the Elements Rn, 112, 114, and 118|first1=R. |last1=Eichler |first2=B. |last2=Eichler|publisher=Paul Scherrer Institut|url=http://lch.web.psi.ch/files/anrep03/06.pdf|accessdate=2010-10-23}}</ref>

|heat fusion=（推算）23.5<ref name=Eichler/>

|heat vaporization=（推算）19.4<ref name=Eichler/>

|oxidation states=0, +2<ref name=Kaldor/>, +4<ref name=Kaldor>{{citebook|title=Theoretical Chemistry and Physics of Heavy and Superheavy Elements|first1=Uzi |last1=Kaldor |first2 =Stephen|last2=Wilson|page=105|year=2003|publisher=Springer|isbn=140201371X|url=http://books.google.com/books?id=0xcAM5BzS-wC&printsec=frontcover&dq=element+118+properties#PPA105,M1|accessdate=2008-01-18}}</ref>

|oxidation states comment=預測

|number of ionization energies=2

|1st ionization energy=（推算）975±155<ref name=Nash/>

|2nd ionization energy=（推算）1450<ref name=Seaborg>{{citebook|title=Modern Alchemy|first=Glenn Theodore |last= Seaborg|year=1994|url=http://books.google.com/books?id=e53sNAOXrdMC&printsec=frontcover#PPA172,M1|page=172|isbn=9810214405|publisher=World Scientific|accessdate=2008-01-18}}</ref>

|atomic radius=（預測）[[1 E-10 m|152]]<ref name="apsidium"/>

|covalent radius=（推算）230<ref name=Seaborg/>

|CAS number=54144-19-3<ref name="webelements">{{citeweb|url=http://www.webelements.com/webelements/elements/text/Uuo/key.html|title=Ununoctium|publisher=WebElements Periodic Table|accessdate=2007-12-09}}</ref>

|isotopes={{Elementbox\_isotopes\_decay | mn=294| sym=Uuo <ref name="full">{{citejournal|last=Oganessian|first=Yu. Ts.|coauthors=Utyonkov, V.K.; Lobanov, Yu.V.; Abdullin, F.Sh.; Polyakov, A.N.; Sagaidak, R.N.; Shirokovsky, I.V.; Tsyganov, Yu.S.; Voinov, Yu.S.; Gulbekian, G.G.; Bogomolov, S.L.; B. N. Gikal, A. N. Mezentsev, S. Iliev; Subbotin, V.G.; Sukhov, A.M.; Subotic, K; Zagrebaev, V.I.; Vostokin, G.K.; Itkis, M. G.; Moody, K.J; Patin, J.B.; Shaughnessy, D.A.; Stoyer, M.A.; Stoyer, N.J.; Wilk, P.A.; Kenneally, J.M.; Landrum, J.H.; Wild, J.H.; and Lougheed, R.W.|title=Synthesis of the isotopes of elements 118 and 116 in the <sup>249</sup>Cf and <sup>245</sup>Cm+<sup>48</sup>Ca fusion reactions|journal=[[Physical Review]] C|volume=74|issue=4|pages=044602|date=2006-10-09|url=http://link.aps.org/abstract/PRC/v74/e044602|doi=10.1103/PhysRevC.74.044602|accessdate=2008-01-18}}</ref>| na=[[synthetic radioisotope|syn]] | hl= ~0.89 ms| dm= [[alpha decay|α]]| de= 11.65 ± 0.06| pn= 290| ps= [[Uuh]]}}

}}

{{pp-move-indef}}

'''Ununoctium'''（'''Uuo'''）<ref name=iupac/>、'''[[Eka]]氡'''或'''118號元素'''，是[[錒系後元素]]，[[原子序]]為118，其[[化學符號]]Uuo是[[國際純粹與應用化學聯合會|IUPAC]]的臨時[[IUPAC元素系統命名法|系統命名]]。<ref>{{cite journal|title=Atomic weights of the elements 2005 (IUPAC Technical Report)|journal=Pure Appl. Chem.|year=2006|volume=78|issue=11|pages=2051–2066| doi=10.1351/pac200678112051| author=Wieser, M.E.}}</ref>在[[元素週期表]]上，它位於[[p區元素|p區]]，也是[[元素週期|第7週期]]中的最後一個元素。Uuo目前是[[人工合成元素|人工合成]]的，屬於18族。其原子序和[[原子量]]為所有已發現元素中最高的。

Uuo是[[放射性]]的，其原子十分不穩定。自2002年，一共只探測到3個（可能4個）<sup>294</sup>Uuo同位素的原子。<ref>{{cite web|url=http://discovermagazine.com/2007/jan/physics/article\_view?b\_start:int=1&-C=|title=The Top 6 Physics Stories of 2006|accessdate=2008-01-18|date=2007-01-07|publisher=Discover Magazine}}</ref>這限制了對它的特性和可能的[[化合物]]的實驗研究，但理論上的計算作出了預測，其中一些還是出乎意料的。例如，Uuo是18族成員，但它有可能並不是[[惰性氣體]]。<ref name=Nash/>之前它曾被認為是一氣體，但現在的預測表示它在[[標準狀況]]下會是[[固體]]，因為[[相對論]]性因素。<ref name=Nash/>

==歷史==

===未成功的嘗試===

1998年末，[[波蘭]]物理學家Robert Smolańczuk發表了有關融合原子核以合成[[超重元素]]原子的計算，當中也包括了Uuo。<ref name=Smolanczuk>{{cite journal|author=Smolanczuk, R.|journal=[[Physical Review]] C|volume=59|issue=5|year=1999|title=Production mechanism of superheavy nuclei in cold fusion reactions|pages=2634–2639|doi=10.1103/PhysRevC.59.2634}}</ref>他的計算表示要製造出Uuo，可以在嚴格控制的環境下融合[[鉛]]和[[氪]]。<ref name=Smolanczuk/>

1999年，[[勞倫斯伯克利國家實驗室]]的研究人員利用這些計算，製造了[[Uuh]]和Uuo，並將發現發佈於[[物理評論快報]]。<ref>{{cite journal|last=Ninov|first=Viktor|coauthors=''et al.''|title=Observation of Superheavy Nuclei Produced in the Reaction of <sup>86</sup>Kr with <sup>208</sup>Pb|journal=[[Physical Review Letters]]|volume=83|pages=1104–1107|date=1999|doi=10.1103/PhysRevLett.83.1104}}</ref>不久之後[[科學 (雜誌)|科學]]雜誌也報導了這一發現。<ref>{{cite journal|author=Service, R. F.|journal=Science|date=1999|volume=284|pages=1751|doi=10.1126/science.284.5421.1751|title=Berkeley Crew Bags Element 118}}</ref>研究人員聲稱達到了以下[[化學反應]]：

:{{Nuclide|Krypton|86}} + {{Nuclide|Lead|208}} → {{Nuclide|Ununoctium|293}} + {{SubatomicParticle|link=yes|Neutron}}.

2000年，他們撤回了此前的發表，因為其他的實驗室及勞倫斯伯克利國家實驗室本身都未能重複這些結果。<ref>{{citenews|url=http://enews.lbl.gov/Science-Articles/Archive/118-retraction.html|publisher=Berkeley Lab|author=Public Affairs Department |title=Results of element 118 experiment retracted|date=2001-07-21|accessdate=2008-01-18}}</ref>2002年6月，實驗室主任宣布原先兩個元素的發現結果是建立於由Victor Ninov編造的數據上的。<ref>{{cite journal|first=Rex|last=Dalton|pages=728–729|title=Misconduct: The stars who fell to Earth|journal=[[Nature (journal)|Nature]]|volume=420|doi=10.1038/420728a|year=2002|pmid=12490902|last1=Dalton|first1=R|issue=6917}}</ref>

===發現===

2002年，Yuri Oganessian在[[俄羅斯]][[杜布納]]的團隊於[[聯合核研究所]]（JINR）首次發現並觀測Uuo原子的衰變。<ref name="pp2002">{{cite journal|author=Oganessian, Yu. T. ''et al.''|title=Results from the first <sup>249</sup>Cf+<sup>48</sup>Ca experiment|url=http://www.jinr.ru/publish/Preprints/2002/287(D7-2002-287)e.pdf|journal=JINR Communication|location=JINR, Dubna|year=2002|language=Russian}}</ref>2006年10月9日，來自聯合核研究所及[[美國]][[加州]][[勞倫斯利福摩爾國家實驗室]]的研究人員宣布<ref name="full"/>他們間接探測到一共3個（可能4個）Uuo-294的原子（其中1或2個發現於2002年，<ref>{{cite web|url=http://159.93.28.88/linkc/118/anno.html|title=Element 118: results from the first <sup>249</sup>Cf + <sup>48</sup>Ca experiment|author=Oganessian, Yu. T. ''et al.''|publisher=Communication of the Joint Institute for Nuclear Research|year=2002|publisher+JINR Publishing Department|accessdate=2008-01-18}}</ref>其餘2個於2005年），通過撞擊[[鉲]]249和[[鈣]]48離子：<ref>{{citenews|title=Livermore scientists team with Russia to discover element 118|url=https://publicaffairs.llnl.gov/news/news\_releases/2006/NR-06-10-03.html|publisher=Livermore press release|date=2006-12-03|accessdate=2008-01-18}}</ref><ref>{{cite journal|author=Oganessian, Yu. T.|title=Synthesis and decay properties of superheavy elements|journal=Pure Appl. Chem.|volume=78|pages=889–904|doi=10.1351/pac200678050889|year=2006}}</ref><ref>{{cite journal|title=Heaviest element made – again|journal=Nature News|publisher=[[Nature (journal)|Nature]]|date=2006|doi=10.1038/news061016-4|author= Sanderson, K.}}</ref><ref>{{cite web|author=Schewe, P. and Stein, B.|title=Elements 116 and 118 Are Discovered|work=Physics News Update|publisher=[[American Institute of Physics]]|date=2006-10-17|url=http://www.aip.org/pnu/2006/797.html|accessdate=2008-01-18}}</ref><ref>{{cite web|url=http://www.washingtonpost.com/wp-dyn/content/article/2006/10/16/AR2006101601083.html|title=Scientists Announce Creation of Atomic Element, the Heaviest Yet|publisher=Washington Post|author=Weiss, R.|date=2006-10-17|accessdate=2008-01-18}}</ref>

:{{Nuclide|Link|Californium|249}} + {{Nuclide|Link|Calcium|48}} → {{Nuclide|Link|Ununoctium|294}} + 3 {{SubatomicParticle|link=yes|Neutron}}.

[[Image:Ununoctium-294 nuclear.svg‎|thumb|left|200px|Uuo-294[[同位素]]的[[放射性衰變]]示意圖。<ref name="full"/>列出同位素的[[衰變能量]]和平均[[半衰期]]。進行[[自發裂變]]的原子以綠色表示。]]

由於[[核聚變]]概率（聚變[[核截面|截面]]約為0.3–0.6 [[靶恩)|pb]] = (3–6)×10<sup>−41</sup> m<sup>2</sup>）很低，實驗經過了48個月，並使用了4×10<sup>19</sup>個[[鈣]]離子，才第一次測得Uuo的合成。<ref name="webelements">{{cite web|url=http://webelements.com/webelements/elements/text/Uuo/key.html|title=Ununoctium|publisher=WebElements Periodic Table|accessdate=2008-01-18}}</ref>然而研究人員很有把握這並不是誤測，因為探測結果是隨機事件的可能性估計小於100,000分之1。<ref>{{cite web|quote="I would say we're very confident."|url=http://pubs.acs.org/cen/news/84/i43/8443element118.html|title=Element 118 Detected, With Confidence|publisher=Chemical and Engineering news|date=2006-10-17|accessdate=2008-01-18}}</ref>

實驗中觀察了3個Uuo原子的α衰變，並提出了第4個通過直接[[自發裂變]]的衰變。計算得出[[半衰期]]為0.89 ms：<sup>294</sup>Uuo通過α衰變為<sup>290</sup>Uuh。由於只觀測到3個原子的衰變，計算出來的半衰期有著很大的誤差：0.89{{±|1.07|0.31}} ms。<ref name="full"/>

:<sup>294</sup>Uuo → <sup>290</sup>Uuh + [[氦|He]]

以證實發現<sup>294</sup>Uuo原子核，通過撞擊<sup>245</sup>Cm和[[鈣|<sup>48</sup>Ca]]離子：

:<sup>245</sup>Cm + <sup>48</sup>Ca → <sup>290</sup>Uuh + 3 {{SubatomicParticle|link=yes|Neutron}}，

另外製造出[[衰變產物]]<sup>290</sup>Uuh，並且比較<sup>290</sup>Uuh與<sup>294</sup>Uuo原子核的[[衰變鏈]]是否相同。<ref name="full"/><sup>290</sup>Uuh原子核十分不穩定，半衰期為14毫秒，衰變為<sup>286</sup>Uuq，再經由[[自發裂變]]或α衰變成為<sup>282</sup>Cn，然後自發裂變。<ref name="full">{{cite journal|last=Oganessian|first=Yu. T.|coauthors=''et al.''|title=Synthesis of the isotopes of elements 118 and 116 in the <sup>249</sup>Cn and <sup>245</sup>Cm + <sup>48</sup>Ca fusion reactions|journal=[[Physical Review]] C|volume=74|issue=4|pages=044602|date=2006|doi=10.1103/PhysRevC.74.044602}}</ref>

根據量子穿隧模型，<sup>294</sup>Uuo的α衰變半衰期預測為0.66{{±|0.23|0.18}} ms<ref name=half-lifes/>，理論核反應能量（Q值）於2004年發表。<ref name=oga04>{{cite journal|journal=Phys. Rev. C|volume=70|pages=064609|year=2004|title=Measurements of cross sections and decay properties of the isotopes of elements 112, 114, and 116 produced in the fusion reactions 233, 238U, 242Pu, and 248Cm+48Ca |author=Oganessian, Yu. T. ''et al.''|doi=10.1103/PhysRevC.70.064609}}</ref>根據Muntian–Hofman–Patyk–Sobiczewski 的宏觀微觀模型的理論Q值的計算得出相當但較低的數值。<ref name=npa07>{{cite journal|journal=Nucl. Phys. A|volume=789|pages=142–154|year=2007|title=Predictions of alpha decay half lives of heavy and superheavy elements|author=Samanta, C.; Chowdhury, R. P.; Basu, D.N.|doi=10.1016/j.nuclphysa.2007.04.001}}</ref>

成功取得Uuo之後，其發現這又開始類似的實驗，從<sup>58</sup>Fe和<sup>244</sup>Pu製造[[Ubn]]（Unbinilium）。<ref>{{citenews|url=https://www.llnl.gov/str/April07/pdfs/04\_07.4.pdf|title=A New Block on the Periodic Table|date=April 2007|publisher=Lawrence Livermore National Laboratory|accessdate=2008-01-18|format=PDF}}</ref>Ubn同位素的半衰期預計以微秒計。<ref name=prc08ADNDT08/><ref name="sciencedirect1">{{cite journal|journal=At. Data & Nucl. Data Tables |volume=94|pages=781–806|year=2008|title=Nuclear half-lives for α -radioactivity of elements with 100 ≤ Z ≤ 130|author=Chowdhury, R. P.; Samanta, C.; Basu, D.N.|doi=10.1016/j.adt.2008.01.003}}</ref>

{{clear}}

{|class="wikitable" style="text-align:center"

|+達到Z=118复核的元素組合

|-

! 目標 !! 撞擊物 !! CN !! 結果

|-

!<sup>208</sup>Pb

|<sup>86</sup>Kr||<sup>294</sup>Uuo||{{no|至今失敗}}

|-

!<sup>249</sup>Cf

|<sup>48</sup>Ca||<sup>297</sup>Uuo||{{yes|反應成功}}

|}<!--Please use {{no|Failure to date}} for reactions which have been tried but failed, and {{yes|Successful reaction}} for successes, thanks-->

==命名==

直至1960年代Uuo仍被稱為eka-emanation（emanation是氡的舊稱）。<ref name=60s/>1979年[[IUPAC]]發表了對元素新命名的建議，並將其命名為ununoctium。<ref name=iupac>{{cite journal|author=Chatt, J.|journal=Pure Appl. Chem.|year=1979|volume=51|pages=381–384|title=Recommendations for the Naming of Elements of Atomic Numbers Greater than 100|doi=10.1351/pac197951020381}}</ref>這是[[IUPAC元素系統命名法|系統命名]]，作為該元素的發現被證實並且IUPAC授予名稱之前的代替名。

2002年發現結果被撤回之前，勞倫斯伯克利國家實驗室的研究人員建議以[[阿伯特·吉奧索]]（Albert Ghoirso，研究團隊的領導成員）命名為ghiorsium（Gh）。<ref>{{cite web|title=Discovery of New Elements Makes Front Page News|url=http://lbl.gov/Science-Articles/Research-Review/Magazine/1999/departments/breaking\_news.shtml|publisher=Berkeley Lab Research Review Summer 1999|year=1999|accessdate=2008-01-18}}</ref>

俄羅斯的發現者於2006年公佈發現。2007年，聯合核研究所主任表示，研究團隊正考慮兩個名字：以[[Georgy Flyorov]]（杜布納的研究實驗室創立人）命名的flyorium，與以[[莫斯科州]]（杜布納所在地）命名的moskovium。<ref>{{cite web|url=http://news.rin.ru/eng/news/9886/9/6/|title=New chemical elements discovered in Russia`s Science City|date=2007-02-12|accessdate=2008-02-09}}</ref>他也表明，雖然這是俄美合作發現的（美國提供撞擊中的目標元素鉲），但名正言順地應以俄羅斯命名，因為聯合核研究所的Flerov核反應實驗室是世界上唯一一座能取得這種成果的設施。<ref>{{cite web|language=Russian|author=NewsInfo|date=2006-10-17|url=http://www.rambler.ru/news/science/0/8914394.html|title =Periodic table has expanded|publisher=Rambler|accessdate=2008-01-18|lang=ru}}</ref><ref>{{cite web|last=Yemel'yanova|language=Russian|first=Asya |date=2006-12-17|url=http://www.vesti.ru/doc.html?id=113947|title=118th element will be named in Russian|publisher=vesti.ru|accessdate=2008-01-18|lang=ru}}</ref>

==特性==

===原子核穩定性與同位素===

[[Image:Island-of-Stability.png|thumb|400px|Uuo位於穩定島的右端，因此其原子核應比預測的更穩定一些。]]

{{main|Uuo的同位素}}

{{see also|穩定島}}

[[原子序]]超過82（[[鉛]]）的元素均沒有穩定的同位素。<ref>{{cite journal|last = Marcillac|first = Pierre de|coauthors = Noël Coron, Gérard Dambier, Jacques Leblanc, and Jean-Pierre Moalic|year = 2003|month = April|title = Experimental detection of α-particles from the radioactive decay of natural bismuth|journal = Nature|volume = 422|pages = 876–878|pmid=12712201|doi = 10.1038/nature01541|issue = 6934}}</ref>原子核的穩定性隨原子序的增加而降低，因此所有原子序超過101（[[鍆]]）的同位素[[半衰期]]都小於1天。然而由於一些仍不甚了解的[[魔數|原因]]，原子序110至114的穩定性稍微提升，因此出現了核物理中的“[[穩定島]]”。這個概念由[[柏克萊加州大學]]教授[[格倫·西奧多·西博格]]提出，並解釋了[[超重元素]]半衰期比本來預計要長的原因。<ref>{{citebook|title=Van Nostrand's scientific encyclopedia|first1=Glenn D. |last1= Considine |first2=Peter H. |last= Kulik|publisher=Wiley-Interscience|year=2002|edition=9|isbn=9780471332305|oclc=223349096}}</ref>Uuo是有[[放射性]]的，其[[半衰期]]少於1[[毫秒]]。不過，這數值已經比某些預計值較長，<ref name=half-lifes/><ref>{{cite journal|title=Heaviest nuclei from 48Ca-induced reactions|first=Yu. T.|last=Oganessian|year=2007|journal= Journal of Physics G: Nuclear and Particle Physics|volume=34|pages=R165–R242|doi=10.1088/0954-3899/34/4/R01}}</ref>因此進一步支持“穩定島”這一理論。<ref>{{cite web|url=http://www.dailycal.org/printable.php?id=21871|title=New Element Isolated Only Briefly|publisher=[[The Daily Californian]]|date=2006-10-18|accessdate=2008-01-18}}</ref>

利用量子穿隧模型來計算，存在著幾個多中子的Uuo同位素，α衰變半衰期接近1毫秒。<ref name=prc08ADNDT08>{{cite journal|journal=Physical Reviews C|volume=77|pages=044603|year=2008|title=Search for long lived heaviest nuclei beyond the valley of stability|first1=Roy P.|last1=Chowdhury |first2=C. |last2=Samanta |first3= D. N. |last3=Basu|doi=10.1103/PhysRevC.77.044603}}</ref><ref name="sciencedirect1"/>

理論計算顯示出，存在著一些比合成的<sup>294</sup>Uuo更穩定的[[Uuo的同位素|同位素]]，最可能的有：<sup>293</sup>Uuo、<sup>295</sup>Uuo、<sup>296</sup>Uuo、<sup>297</sup>Uuo、<sup>298</sup>Uuo、<sup>300</sup>Uuo和<sup>302</sup>Uuo。<ref name=half-lifes/><ref name=odd>{{cite journal|journal=Nuclear Physics A|volume=730|year=2004|pages=355–376|title=Entrance channels and alpha decay half-lives of the heaviest elements|first1=G. |last1=Royer|first2= K. |last2=Zbiri|first3 =C. |last3=Bonilla|doi=10.1016/j.nuclphysa.2003.11.010}}</ref>其中<sup>297</sup>Uuo擁有較長半衰期原子核的機會最大，<ref name=half-lifes>{{cite journal|journal=Phys. Rev. C|volume=73|pages=014612|year=2006|title=α decay half-lives of new superheavy elements|first1=Roy P.|last1=Chowdhury |first2=C. |last2=Samanta |first3= D. N. |last3=Basu|doi=10.1103/PhysRevC.73.014612}}</ref><ref name=odd/>所以可能會是未來針對該元素的重點工作對象。一些<sup>313</sup>Uuo附近的較多中子的原子核也能有較長的半衰期。<ref>{{cite journal|title=Half-life predictions for decay modes of superheavy nuclei|year=2004|journal=Journal of Physics G: Nuclear and Particle Physics|volume=30|pages=1487–1494|doi=10.1088/0954-3899/30/10/014|first1=S. B.|last1=Duarte|first2=O. A. P.|last2=Tavares|first3=M.|last3=Gonçalves|first4=O.|last4=Rodríguez|first5=F.|last5=Guzmán|first6=T. N.|last6=Barbosa|first7=F.|last7=García|first8=A.|last8=Dimarco}}</ref>

===計算的原子及物理特性===

Uuo屬於18族，沒有[[價電子]]。這一族的元素幾乎對所有普通化學（如氧化作用）反應顯惰性，因為其價電子層符合[[八隅體規則]]。這樣形成的[[電子排布]]是緊密和穩定的，並擁有最低能量。<ref>{{cite web|last=Bader|first=Richard F.W|url=http://miranda.chemistry.mcmaster.ca/esam/|title=An Introduction to the Electronic Structure of Atoms and Molecules|publisher=McMaster University|accessdate=2008-01-18}}</ref>相信同樣地，Uuo也有填滿了的價電子層，其電子排布為：7s<sup>2</sup>7p<sup>6</sup>。<ref name=Nash/>

因此，一些人預計Uuo的物理及化學特性與同族的其他元素相似，最近似於其上的惰性氣體[[氡]]。<ref>{{cite web|url=http://lenntech.com/Periodic-chart-elements/Uuo-en.htm|title=Ununoctium (Uuo) – Chemical properties, Health and Environmental effects|publisher=Lenntech|accessdate=2008-01-18|archiveurl = http://web.archive.org/web/20080116172028/http://lenntech.com/Periodic-chart-elements/Uuo-en.htm |archivedate = January 16, 2008|deadurl=yes}}</ref>根據週期表的趨勢，Uuo估計比氡更活躍一些。然而，理論計算顯示，它可能會非常活躍，並不一定能被稱為惰性氣體。<ref name=Kaldor>{{citebook|title=Theoretical Chemistry and Physics of Heavy and Superheavy Elements|first1=Uzi|last1=Kaldor|first2=Stephen|last2=Wilson|page=105|year=2003|publisher=Springer|isbn=140201371X}}</ref>除此之外，Uuo甚至可能比[[Uuq]]和[[鎶]]還活躍。<ref name=Nash>{{cite journal|title=Atomic and Molecular Properties of Elements 112, 114, and 118|first=Clinton S.|last=Nash|journal=Journal of Physical Chemistry A|year=2005|volume=109|issue=15|pages=3493–3500|doi=10.1021/jp050736o|pmid=16833687|last1=Nash|first1=CS}}</ref>其最後一個填滿的7p[[支殼層]]的徑向膨脹及能量的不穩定性導致了Uuo相對氡明顯較高的化學活躍性。<ref name=Nash/><ref>the actual quote is: ''"The reason for the apparent enhancement of chemical activity of element 118 relative to radon is the energetic destabilization and radial expansion of its occupied 7p<sub>3/2</sub> [[spinor]] shell"''</ref>更準確地說，7p電子與7s<sup>2</sup>電子間可觀的[[自旋-軌道作用]]導致第二個價電子層在[[Uuq]]處填滿，使Uuo的穩定性大大降低。<ref name=Nash/>計算也指出，Uuo和其他惰性氣體不同：它接受電子時會釋放能量，也就是它有正的[[電子親和力]]。<ref name=Pyykko>{{cite journal|title=QED corrections to the binding energy of the eka-radon (Z=118) negative ion|first1=Igor|last1=Goidenko|first2=Leonti|last2=Labzowsky|first3=Ephraim|last3=Eliav|first4=Uzi|last4=Kaldor|first5= Pekka |last5=Pyykko¨|journal=Physical Review A|volume=67|year=2003|pages=020102(R)|doi=10.1103/PhysRevA.67.020102}}</ref><ref>{{cite journal|volume=77|issue=27|journal=Physical Review Letters|date=1996|title=Element 118: The First Rare Gas with an Electron Affinity|first1=Ephraim |last1=Eliav |first2=Uzi |last2=Kaldor|doi=10.1103/PhysRevLett.77.5350|pages=5350|pmid=10062781|last3=Ishikawa|first3=Y|last4=Pyykkö|first4=P}}</ref><ref>Nevertheless, [[quantum electrodynamic]] corrections have been shown to be quite significant in reducing this affinity (by decreasing the binding in the [[anion]] Uuo<sup>−</sup> by 9%) thus confirming the importance of these corrections in [[superheavy atom]]s. ''See Pyykko''</ref>

Uuo的[[極化率]]是它之前所有元素中最高的，幾乎是氡的兩倍。<ref name=Nash/>從其他惰性氣體的沸點趨勢估計，Uuo的沸點處於320 K和380 K。<ref name=Nash/>這和先前的估值263 K<ref name=Seaborg>{{citebook|title=Modern Alchemy|authorlink=Glenn Theodore Seaborg|first=Glenn Theodore|last=Seaborg|year=1994|isbn=9810214405|publisher=World Scientific|page =172}}</ref>和247 K要高。<ref>{{cite journal|journal=Journal of Radioanalytical and Nuclear Chemistry|volume=251|issue=2|year=2002|pages=299–301|title=Boiling points of the superheavy elements 117 and 118|first=N. |last=Takahashi|doi=10.1023/A:1014880730282}}</ref>甚至加上巨大的計算誤差，Uuo在[[標準狀況]]下仍很不可能是一氣體。<ref name=Nash/><ref name=note>It is debatable if the name of the group 'noble gases' will be changed if ununoctium is shown to be non-volatile.</ref>由於其他惰性氣體的液態溫度區間很小，介乎2 K至9 K，Uuo應該是[[固體]]。如果它是[[氣體]]的話，將會是標準狀態下最密集的氣體（儘管它和其餘的惰性氣體一樣是[[單原子]]的）。

由於極化率極高，Uuo的[[電離能]]特別的低（類似於[[鉛]]，氡的70%<ref name=hydride>{{cite journal|journal=Journal of Chemical Physics|volume=112|issue=6|date=2000|title=Spin–orbit effects on the transactinide p-block element monohydrides MH (M=element 113–118)|first1=Young-Kyu |last1=Han|first2= Cheolbeom |last2=Bae|first3= Sang-Kil |last3=Son|first4= Yoon Sup |last4=Lee|doi=10.1063/1.480842|pages=2684}}</ref>，明顯低於Uuq<ref>{{cite journal|journal=Journal of Physical Chemistry A|volume=1999|issue=3|pages=402–410|title=Spin-Orbit Effects, VSEPR Theory, and the Electronic Structures of Heavy and Superheavy Group IVA Hydrides and Group VIIIA Tetrafluorides. A Partial Role Reversal for Elements 114 and 118|first=Clinton S.|last=Nash|doi=10.1021/jp982735k|year=1999|last2=Bursten|first2=Bruce E.}}</ref>），並擁有標準[[凝聚態物理|凝聚態]]。<ref name=Nash/>

===預測的化學物===

[[Image:Square-planar-3D-balls.png|right|130px|thumb|{{chem|Xe||F|4}}與{{chem|Rn||F|4}}擁有平面四方形結構。]]

[[Image:Tetrahedral-3D-balls.png|right|130px|thumb|{{chem|Uuo||F|4}}預計擁有四面體結構。]]

還沒有Uuo的化合物被合成出來，但針對[[理論化學|理論化合物]]的計算自從1964年起就開始進行了。<ref name=60s>{{cite journal|doi=10.1016/0022-1902(65)80255-X|year=1965|publisher=Elsevier Science Ltd.|title=Some physical and chemical properties of element 118 (Eka-Em) and element 86 (Em)|first=A. V.|last=Grosse|journal=Journal of Inorganic and Nuclear Chemistry|volume=27|issue=3|pages=509–19}}</ref>如果一個元素的[[電離能]]足夠高的話，它會非常難[[氧化]]，因此最可能的[[氧化態]]是0（正如其餘的惰性氣體）。<ref name="compounds">{{cite web|publisher=WebElements Periodic Table|url=http://webelements.com/webelements/elements/text/Uuo/comp.html|title=Ununoctium: Binary Compounds|accessdate=2008-01-18}}</ref>

有關[[二聚體]]{{chem|Uuo|2}}的計算指出，[[化學鍵]]間的交互作用大約等於{{chem|Hg|2}}的，[[鍵離解能]]為6 kJ/mol，約為{{chem|Rn|2}}的四倍。<ref name=Nash/>但最出乎意料的是，其[[鍵長]]比{{chem|Rn|2}}的還短0.16 Å。<ref name=Nash/>另一方面，化合物UuoH<sup>+</sup>的鍵離解能（或Uuo的[[質子親和能]]）比RnH<sup>+</sup>小。<ref name=Nash/>

UuoH中的Uuo和氫之間的鍵可看作是純粹的[[范德華引力]]，而不是真正的[[化學鍵]]。<ref name=hydride/>另外，Uuo與一些[[電負性]]高的元素能組成穩定的化合物，甚至勝過[[鎶]]或[[Uuq]]。<ref name=hydride/>[[氯]]化物{{chem|Uuo||F|2}}和{{chem|Uuo||F|4}}中預測有穩定氧化態+2和+4。<ref name=fluoride>{{cite journal|journal=Journal of Physical Chemistry A|volume=103|issue=8|pages=1104–1108|date=1999|title=Structures of RgFn (Rg = Xe, Rn, and Element 118. n = 2, 4.) Calculated by Two-component Spin-Orbit Methods. A Spin-Orbit Induced Isomer of (118)F<sub>4</sub>|first1=Young-Kyu|last1=Han|first2=Yoon Sup|last2=Lee|doi=10.1021/jp983665k}}</ref>這和Uuo格外活躍的化學性質同樣都是因為其自旋-軌道作用。例如，計算顯示，Uuo和{{chem|F|2}}產生{{chem|Uuo||F|2}}的化學反應會釋出106 kcal/mol的能量，其中約46 kcal/mol來自於這些交互作用。<ref name=hydride/>對比下，類似的分子{{chem|Rn||F|2}}的產生能量為49 kcal/mol，交互作用佔約10 kcal/mol。<ref name=hydride/>同樣的交互作用穩定了{{chem|Uuo||F|4}}的四面體形T<sub>d</sub>結構，有別於[[四氟化氙|{{chem|Xe||F|4}}]]和{{chem|Rn||F|4}}的平面四方形D<sub>4h</sub>結構]]。<ref name=fluoride/>當中的Uuo–F鍵最可能是[[離子鍵]]，而非[[共價鍵]]，因此UuoF<sub>n</sub>化合物都不具備揮發性。<ref name=Kaldor/><ref>{{cite journal|journal=Journal of the Chemical Society, ChemicalCommunications|year=1975|pages=760–761|doi=10.1039/C3975000760b|title=Fluorides of radon and element 118|first =Kenneth S.|last = Pitzer}}</ref>別於其他的惰性氣體，Uuo的[[電正性]]足以與[[氯]]產生Uuo–Cl鍵。<ref name=Kaldor/>

因為一共只製造了4個Uuo原子，所以目前它在[[basic research|基本科學研究]]範疇以外沒有任何用途。當足夠Uuo集聚在一處，會造成[[輻射中毒|輻射危險]]。<ref name=70s>{{cite web|publisher=WebElements Periodic Table|url=http://webelements.com/webelements/elements/text/Uuo/biol.html|title=Ununoctium: Biological information|accessdate=2008-01-18}}</ref>

==參見==

\* [[錒系後元素]]

\* [[超鈾元素]]

\* [[Uuh]]

==參考資料==

{{clear}}

{{Reflist|colwidth=30em}}

==外部鏈接==

{{wikinews|Controversy-Plagued Element 118, the Heaviest Atom Yet, Finally Discovered}}

{{Commons|Ununoctium}}

\* [http://web.archive.org/web/20061129112314/http://flerovlab.jinr.ru/flnr/elm118.html Element 118: experiments on discovery], archive of discoverers' official web page

\* [http://www.chemistry-blog.com/2006/10/16/discovery-of-element-118-by-oganessian-dont-call-it-ununoctium/ Chemistry Blog: Independent analysis of 118 claim]

\* [http://www.webelements.com/ununoctium/ WebElements: Ununoctium]

\* [http://education.jlab.org/itselemental/ele118.html It's Elemental: Ununoctium]

\* [http://iupac.org/publications/pac/75/10/1601/ On the Claims for Discovery of Elements 110, 111, 112, 114, 116, and 118 (IUPAC Technical Report)]

\* "[http://query.nytimes.com/gst/fullpage.html?res=9B07E7DB1E30F934A25753C1A9609C8B63 Element 118, Heaviest Ever, Reported for 1,000th of a Second]", NYTimes.com.

\* Eric Scerri, The Periodic Table, Its Story and Its Significance, Oxford University Press, New York, 2007.

{{Compact periodic table}}

{{Link FA|ca}}

{{Link FA|es}}

{{Link GA|fr}}

{{Link GA|sv}}

[[af:Ununoctium]]

[[als:Ununoctium]]

[[ar:أنون أوكتيوم]]

[[ast:Ununoctiu]]

[[bn:ইউনুনকটিয়াম]]

[[be:Унуноктый]]

[[bs:Ununoktijum]]

[[bg:Унуноктий]]

[[ca:Ununocti]]

[[cs:Ununoctium]]

[[co:Ununoctiu]]

[[cy:Ununoctiwm]]

[[da:Ununoctium]]

[[de:Ununoctium]]

[[et:Ununoktium]]

[[el:Ουνουνόκτιο]]

[[es:Ununoctio]]

[[eo:Ununoktio]]

[[eu:Ununoktio]]

[[fa:آن‌ان‌اکتیوم]]

[[fr:Ununoctium]]

[[fy:Ununoktium]]

[[fur:Ununoctium]]

[[ga:Únúnoictiam]]

[[gv:Oonoonoctium]]

[[gl:Ununoctio]]

[[xal:Унуноктиум]]

[[ko:우누녹튬]]

[[hr:Ununoktij]]

[[id:Ununoktium]]

[[it:Ununoctio]]

[[he:אונונאוקטיום]]

[[la:Ununoctium]]

[[lv:Ununoktijs]]

[[lb:Ununoctium]]

[[lij:Ununoctio]]

[[hu:Ununoktium]]

[[mk:Унуноктиум]]

[[ml:അൺഅൺഒക്റ്റിയം]]

[[nl:Ununoctium]]

[[ja:ウンウンオクチウム]]

[[no:Ununoctium]]

[[nn:Ununoctium]]

[[oc:Ununòcti]]

[[nds:Ununoctium]]

[[pl:Ununoctium]]

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[[qu:Ununoktiyu]]

[[ru:Унуноктий]]

[[stq:Ununoctium]]

[[scn:Ununoctiu]]

[[simple:Ununoctium]]

[[sk:Ununoctium]]

[[sl:Ununoktij]]

[[sr:Унуноктијум]]

[[sh:Ununoktijum]]

[[fi:Ununoktium]]

[[sv:Ununoctium]]

[[tl:Ununoktio]]

[[th:อูนอูนออกเทียม]]

[[tr:Ununoktiyum]]

[[uk:Унуноктій]]

[[ug:Ununoctium]]

[[vi:Ununocti]]

[[war:Ununoctium]]

[[yo:Ununoctium]]

[[zh-yue:Uuo]]

[[zh:Uuo]]