

[return to updates](#)

Explaining the Density of Osmium



by Miles Mathis

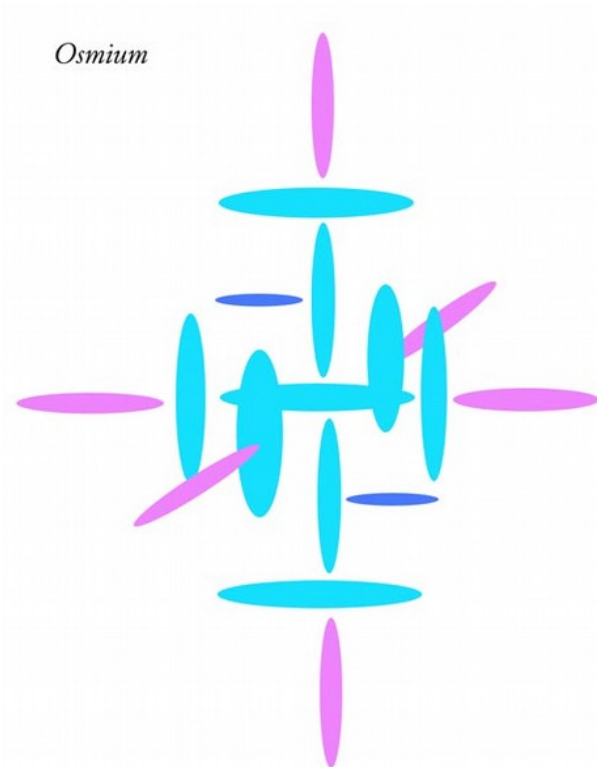
First published April 15, 2013

Updated June 12, 2022

This is another question the mainstream never asks, since they know they can't answer it. A physics that “knew everything”—as Hawking bragged—should be able to tell us why dense elements are dense. But they have nothing good for us here. So let us go to my nuclear diagrams, to see if we can find a straightforward answer.

Osmium is the densest element, denser than Lead, Tungsten, Gold, and even Platinum. It is also one of the rarest. Studying its composition should tell us why.

Osmium is neither a rare earth element nor a radioactive element. So why is it so rare? Might its rareness be linked to its density? We will see. This is the diagram of Osmium:



Cyan disks represent triple alphas, or six protons. Violet disks represent three protons. Blue disks represent two protons. So Osmium, like Gold and Mercury, is built on a Xenon base. The central cyan disks are Xenon. We then plug additional protons into the nucleus above the Xenon base.

What to look at here is the blue disks which plug into the central pillar. This is what answers our main question, as to why Osmium is the densest element. If this were a diagram of Mercury or Lutetium, we would find those blue disks black instead, representing only one proton in each of those positions. But with the elements around Osmium, those positions are blue. Those elements have doubled up the protons “down below”, and since that inner position is physically nearer the center of the nucleus than the outer 4th level, it creates a tighter, more compact nucleus. Of the dense elements from 76 to 79, Osmium has the fewest *outer* protons, giving it less mass far away from center. Hence, it is more dense.

You will see it better perhaps if we compare Osmium to Platinum. First we hit Iridium at #77, which adds another proton to the inner level, to keep the outer levels equal. You will say we now have an imbalance in the inner level, but not if we put a neutron opposite the odd proton down there. Those inner protons are close enough to the spin axis that they don't have as much centrifugal effect. But an imbalance in the outer level would have much more, and would be fatal. So Iridium remains very heavy, like Osmium, maybe even heavier. The big drop off is with the next step to Platinum at #78 and you can see why with my diagrams. Adding one more will give us six to work with, so we can put all six in the outer level, making four in each position. That level would now be red instead of violet. With more mass further from the axis, Platinum is far less dense than Iridium. Iridium has 18 protons in that outer level, while Platinum has 24. And since the next element Gold starts putting protons down below again, to keep the outer level equal, Platinum is also less dense than Gold at the atomic level. This is known (Gold has smaller radius), although the current explanations are convoluted and contradictory.

So why does metallic Platinum weigh more than Gold? The current mainstream answer has to do with the geometry of the molecular lattices, but that isn't the right answer. The right answer is due to the strength of the molecular bonds between adjacent Platinum atoms. We can see this straight from the conductivity: Platinum is more conductive than Gold, which means more charge is being conducted south to north along the pole, from atom to atom. That extra charge will more strongly link adjacent atoms, making the bond lengths *shorter*. Since both elements have four protons north and south, why is that? Again, it is due to that extra proton Gold has down below. That proton actually interferes with through charge somewhat, since it pulls a bit of charge out of the axis. Neutrons down there acts plugs, but protons don't. They fit nicely in those slots, preventing charge from getting IN, but they actually draw a little charge OUT. Which is why Gold is less conductive than Platinum. Through charge, or pole-to-pole charge, is what determines conductivity, and it also determines the metallic bond strength here.

So we have explained the density very easily, but we still have to explain why these elements double up down below, while Mercury and others don't. As with all other elements, we have to look at nuclear balance. When trying to understand why the nuclei are built as they are, we have to look first at balance, as I have shown in many previous papers. At each number, the nucleus tries to build itself in the most stable manner possible, taking into account both the number of nucleons and the channeling of charge. Since neutrons aren't (normally) bound as tightly into the charge channels, we can understand most configurations just by looking at the protons, as here. The protons determine the charge channels and the neutrons then just follow along—as do the electrons.

Notice that Osmium is balanced all round, with purple disks in all six outer positions. The nucleus likes this configuration for obvious reasons, and will take it whenever it can. At many numbers, it can't create this sort of perfect balance no matter what it does, but in a surprising number of elements it does find a balance like this. If Osmium puts one proton in each position down below, or three, it can't create this balance. But with two, it does.

Osmium has to close those inner holes somehow. It can't leave them open. If the inner holes were open, Osmium would have two problems, both of them fatal. The 4th level protons pull charge through the nucleus quite strongly. All elements above Xenon have stronger charge channels than Xenon, and it is because these 4th level protons are pulling charge through the nucleus like fans. If you don't close the inner holes, the ambient charge field moves through those positions, and it can break up the nucleus that way. Even worse is that unfilled inner holes leave the inner part of the nucleus with too little mass compared to the outer level. We don't see this problem with smaller elements, but with larger elements it is major factor. See all those protons in the 4th level? Well, they are all some distance from the nuclear center. Since the nucleus is spinning as a whole, this create a centrifugal force, and the more mass you have out from center, the more mass imbalance you have. These big nuclei need more mass toward the center to offset that problem, and the way they handle that is by filling those inner holes.

Yes, those inner holes can be filled with neutrons as well, and large elements have neutrons down there, too. But due to their charge profiles, protons are more reliable hole fillers than neutrons. As we know from Uranium, neutrons are pretty easy to knock out in the right circumstances. Protons are much harder to knock out. We will study this in more detail in subsequent papers.

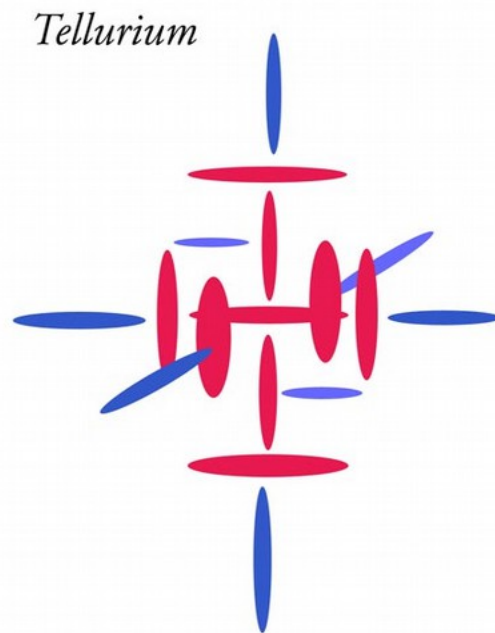
Those who haven't read my previous [nuclear diagramming papers](#) may not understand what I mean by holes. Well, each disk I have diagrammed here is like a compact disk (CD), with a charge hole in the middle. I don't draw all the holes, but they are implied. [See more recent additions, especially to the

nuclear diagramming paper, where I have had a professional diagram the holes.] The hole represents the pole of the proton. Since the proton intakes photons at its poles, the poles act as intake holes. Since each proton is spinning very fast, and since this spin tends to force most of the charge emission to the proton equator, I don't have to draw the proton as a sphere (even those it is one). Since I am diagramming the emitted charge field of the proton, not the body of the proton itself, I can simplify each sphere into a disk with a hole in the middle. The charge field then goes in the hole and out on the disk's edges. In this way we can follow the charge channeling through the nucleus. And that is why I always have my disks meeting edge to hole.

We can also explain the oxidation states of Osmium with this diagram. Osmium has many oxidation states, but one of them is the rare +8. Osmium has this oxidation state because all eight holes are equally available for bonding. Although all eight positions—the six 4th level positions plus the two inner positions—are filled, none of them are completely filled. Each hole can take six protons, but but none *has* six protons. Only three are filled, leaving three open.

Actually, as we see, the eight positions are not quite equal. The two inner positions will not act precisely like the six outer positions. The inner positions are “more open” but harder to get to. They are more open because they are 1/3rd full instead of 1/2. But they are harder to get to because they are inner positions. These two factors almost balance out, giving Osmium a potential +8 oxidation state in some instances. We will look more closely at this “balancing out” of factors in subsequent papers.

So why is Osmium the least abundant stable element in the Earth's crust? I am not sure, but I suggest it has more to do with its balance than its density. Osmium may be rare on Earth for the same reason Tellurium is. Both are very balanced in diagram, with a filled 4th level and many oxidation states. This means that in primordial states like the Earth's formation, Osmium may have been carried off in compound much in the same way Tellurium was. Although Osmium wasn't carried off with hydrides as we are told Tellurium was, Osmium may have vaporized as Osmium tetroxide at low temperatures or with Fluorine or Chlorine or Methylnitrene at higher temperatures.



Given my diagram, why does the mainstream model believe Osmium has two electrons in the outer

shell? Because in cases like this, the mainstream model—seeing the dominance of the two axial levels (top and bottom) in oxidation and other influences—treats those holes as a level all their own. I treat them as part of the 4th level, along with the carousel holes, giving us six main bonding locations in that level. But because the axial level acts differently in some ways than the carousel level, this confuses the mainstream, and they (sometimes) separate out the two. The two most dominant axial slots in Osmium are then taken as a level all their own. This analysis is not completely wrong, so I won't criticize it too harshly. The axial level *does* have some dominant characteristics in bonding, and the electrons in those positions will predominate in some reactions. We have seen in previous papers that the mainstream's Madelung rules and such often fail, and I have shown why. But there is a great deal of overlap in my theory and current theory, as you would expect. Chemistry and particle physics couldn't have gotten along as well as they have without getting a lot things almost right.