

Moscovium (Mc) - Student Datasheet

Atomic number 115 - Synthetic superheavy element · Group 15 - Group 15 - Period 7 - p-block

Moscovium is element 115, a synthetic superheavy element named for the Moscow region. Only small numbers of short-lived atoms have been produced, so its nuclear identity is measured far more directly than its bulk chemistry: melting point, boiling point, density and crystal structure remain experimentally unknown.

Quick reference

Atomic number	115
Relative atomic mass	[289]
Electron configuration	[Rn] 5f ¹⁴ 6d ¹⁰ 7s ² 7p ³ · reference prediction
Common oxidation state(s)	Bulk/common states not experimentally established
Density	Unknown
Melting point	Unknown
Boiling point	Unknown
Structure near room temperature	Bulk crystal structure unknown

Structure & orbitals

Reference isotope: ²⁸⁹Mc - 115 protons + 174 neutrons. Ground-state/reference electron configuration: [Rn] 5f¹⁴ 6d¹⁰ 7s² 7p³ · reference prediction.

These 7s and 7p clouds are qualitative nonrelativistic teaching references for an isolated atom. The p orientation control changes the axis of the same angular form. For element 115, strong spin-orbit splitting and many-electron relativistic effects are essential, so the viewer must not be interpreted as a measured orbital image or complete relativistic wavefunction.

Material / molecular structure: No macroscopic moscovium sample exists; Element Lookup does not invent a crystal lattice

Phase / temperature context

No macroscopic moscovium sample exists, so accepted experimental melting, boiling and bulk phase boundaries are unavailable. The temperature control is therefore an evidence-context track only; it shows a 293 K reference without fabricating solid-liquid-gas transitions.

Five things to remember

1. Atomic number 115 means every moscovium nucleus contains 115 protons.
2. Moscovium is synthetic and highly radioactive; only small numbers of atoms have been made.
3. The commonly cited ground-state configuration [Rn] 5f¹⁴ 6d¹⁰ 7s² 7p³ is a reference prediction/assignment for an atom in a strong relativistic regime.
4. No measured macroscopic melting point, boiling point, density or crystal structure exists.
5. IUPAC approved the name moscovium (Mc) in 2016, honoring the Moscow region associated with the Joint Institute for Nuclear Research.

Real-world context

Superheavy research

Moscovium exists as an atom-at-a-time research subject used to test nuclear models and the limits of the periodic table.

Decay chains

Observed alpha-decay chains help identify produced nuclei and connect moscovium experiments to daughter superheavy elements.

International collaboration

The discovery claim involved JINR in Dubna together with US laboratories including Lawrence Livermore and Oak Ridge.

Relativistic chemistry

Theory explores how strong relativistic effects may change Group 15 chemistry compared with lighter elements.

No commercial use

Moscovium has no practical commercial application; its current use is scientific research.

Where on Earth? / geography modes

Synthesis research - Dubna + US collaborators

Discovery-era work joined the Joint Institute for Nuclear Research with US national-laboratory collaborators

Examples/context: Dubna; Oak Ridge; Livermore

Naming geography - Moscow region

The name moscovium honors the Moscow region, home to the Joint Institute for Nuclear Research

Examples/context: Moscow region; Dubna

Research-only element - Atom-at-a-time science

Moscovium has no mine, production commodity or commercial-use geography

Examples/context: Accelerator research; Nuclear detection; Decay analysis; Theory

Isotopes

Isotope	Status / timescale	Why it matters
²⁸⁹ Mc	Synthetic · short-lived	A key isotope associated with moscovium reference data; no natural abundance exists.
²⁸⁸ Mc	Synthetic · very short-lived	RSC lists an approximate sub-second half-life for this isotope; evaluated values can be updated as nuclear data improve.
Moscovium isotope family	No stable isotopes	All known moscovium isotopes are synthetic and radioactive, so isotope-specific nuclear evidence is central.

Evidence note

Moscovium's atomic number, synthesis/discovery record and isotope/decay evidence are experimental. The displayed electron configuration is a reference prediction/assignment in a strongly relativistic regime. Macroscopic density, melting point, boiling point and crystal structure remain unknown and are intentionally not invented.

Safety boundary

Moscovium synthesis and radioactive-material work belong to specialized licensed research. This page is intentionally non-operational and does not provide accelerator settings, target preparation, isotope-separation or other synthesis instructions.

Review questions

What is moscovium's atomic number?

Answer: 115. Moscovium is element 115.

Which statement about its bulk crystal structure is correct?

Answer: It is experimentally unknown. No macroscopic moscovium crystal has been measured.

What is moscovium currently used for?

Answer: Scientific research only. Only tiny numbers of atoms have been produced.

What does Group 15 placement tell us?

Answer: It gives periodic context but does not make bulk bismuth properties measured for Mc. Periodic extrapolation must be separated from direct evidence.

Why is the temperature track marked unknown?

Answer: No measured macroscopic phase boundaries exist. The page preserves the absence of bulk phase data rather than fabricating transitions.

Frequently asked questions

What is moscovium?

Moscovium is synthetic chemical element 115, symbol Mc, in Group 15.

What is moscovium used for?

Only scientific research. It has no commercial or everyday use.

What does moscovium look like?

No macroscopic sample has been produced, so a measured bulk appearance is not available. Metallic-looking illustrations are predictions or artistic conventions, not photographs of bulk moscovium.

Is moscovium a metal?

It is generally predicted/classified as a superheavy metallic element, but bulk metallic properties have not been measured. Element Lookup labels that distinction explicitly.

Who discovered moscovium?

The discovery claim involved the Joint Institute for Nuclear Research in Dubna with US collaborators including Lawrence Livermore and Oak Ridge; IUPAC recognized the claim and approved the name in 2016.

What is moscovium's electron configuration?

A commonly used reference prediction is $[\text{Rn}] 5f^{14} 6d^{10} 7s^2 7p^3$, but relativistic effects are strong and this is not a directly imaged electron cloud.

Sources used for this guide

- Royal Society of Chemistry - Moscovium

<https://periodic-table.rsc.org/element/115/moscovium>

- IUPAC - Names of elements 113, 115, 117 and 118

<https://iupac.org/iupac-announces-the-names-of-the-elements-113-115-117-and-118/>

- IUPAC - Naming announcement and discovery context

<https://iupac.org/iupac-is-naming-the-four-new-elements-nihonium-moscovium-tennessine-and-oganesson/>

This datasheet is a learning aid. Interactive 3D models are teaching models; uncertainty and predicted values must remain labelled. Search-demand data may guide explanation, but scientific values come from cited scientific sources.