

Asteroid value

diameter (m): 500
 radius (cm): 25,000
 volume (cm³): 65,449,791,666,667 (4/3πr³)

Platinum group metal (PGM) value
 of one near-Earth asteroid
 (H ordinary chondrite)
 with diameter ~500 m
 and the density of
 Itokawa or Eros

Itokawa density
 (1.95 g/cm³):
 (rubble pile)

127,627,093,750,000 g
 127,627,093,750 kg
 127,627,094 ton

August 2009

Platinum group metal	H Ord. Chondrite (ppm)	g/asteroid	oz t/ast.	\$/oz t*	\$/asteroid
44 Ru Ruthenium	1.100	140,389,803	4,513,637	580	2,616,103,994
45 Rh Rhodium	0.210	26,801,690	861,694	6,191	5,334,336,001
46 Pd Palladium	0.845	107,844,894	3,467,294	357	1,237,962,601
77 Ir Iridium	0.770	98,272,862	3,159,546	447	1,412,222,225
78 Pt Platinum	1.580	201,650,808	6,483,224	1,307	8,473,573,804

574,960,057 g

574,960 kg

575 ton: return

\$19,074,198,625

Eros density
 (2.67 g/cm³):
 (solid)

174,750,943,750,000 g
 174,750,943,750 kg
 174,750,944 ton

Platinum group metal	H Ord. Chondrite (ppm)	g/asteroid	oz t/ast.	\$/oz t*	\$/asteroid
44 Ru Ruthenium	1.100	192,226,038	6,180,211	580	3,582,050,084
45 Rh Rhodium	0.210	36,697,698	1,179,858	6,191	7,303,936,986
46 Pd Palladium	0.845	147,664,547	4,747,525	357	1,695,056,484
77 Ir Iridium	0.770	134,558,227	4,326,147	447	1,933,658,123
78 Pt Platinum	1.580	276,106,491	8,877,030	1,307	11,602,277,978

787 ton: return

\$26,116,979,655

Detected NEAs: 6,021 *
 Detected NEAs D ≥ 500 m: 2,210
 Expected NEAs D ≥ 500 m: ~6,000
Detected VNEAs D ≥ 500 m: 84 **

Annual PGM demand (2007): 495 ton
 International Space Station: 420 ton

Observed-fall meteorites,
 H Ordinary Chondrites: 28%

* Metal prices (troy ounces): 2007; asteroid counts: 14 March 2009
 ** VNEAs (very-near-Earth asteroids): **easier to reach than the moon.**

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Data sources

Asteroid densities

Itokawa: Abe S, Mukai T, Hirata N, et al. Mass and Local Topography Measurements of Itokawa by Hayabusa. Science 2006;312(5778):1344-47.

Eros: Miller JK, Konopliv AS, Antreasian PG, et al. Determination of Shape, Gravity, and Rotational State of Asteroid 433 Eros. Icarus 2002;155:3-17.

Asteroid size estimates (H 19.5 → D: 330 - 750 m; average D: 540 m)

NASA. Near Earth Object Program. Glossary: Absolute Magnitude (H)
<<http://neo.jpl.nasa.gov/glossary/h.html>>

NEA and VNEA populations

Benner L. Delta-v for spacecraft rendezvous with all known near-Earth asteroids (q < 1.3 AU). NASA JPL.
<http://echo.jpl.nasa.gov/~lance/delta_v/delta_v.rendezvous.html>

Bottke WF, Durda DD, Nesvorný D, et al. Linking the collisional history of the main asteroid belt to its dynamical excitation and depletion. Icarus 2005;179:63-94.

Ordinary Chondrite elemental abundances

Lodders K and Fegley B Jr. The planetary scientist's companion. Oxford: Oxford University Press. 1998.

Observed-fall meteorite statistics (H ordinary chondrites)

The Meteoritical Society. Meteoritical bulletin database.
<<http://tin.er.usgs.gov/meteor/metbull.php>>

PGM average 2007 prices

Johnson Matthey. Platinum Today.
<http://www.platinum.matthey.com/prices/price_charts.html>

PGM annual demand

Johnson Matthey. Platinum 2008: March 2008.
<http://www.platinum.matthey.com/uploaded_files/Pt2008/08_complete_publication.pdf>

International Space Station

<http://en.wikipedia.org/wiki/International_Space_Station>

This chart: <http://abundantplanet.org/charts>

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