In modern history, John D. Rockefeller was the richest (adjusting for inflation) individual, with a net worth estimated to be 350 billion. Today amongst living billionaires, Rockefeller’s net worth exceeds the combined net worth of the current richest people alive: Jeff Bezos at 113 billion and Bill Gates at 98 billion.

So, where could another natural resource lay, ready to be extracted? The answer to that question could be soaring over our heads.

**Abundant Asteroids**

In the solar system, nearly a million of pieces of space rubble – known as asteroids – float around in space. These pieces, leftovers from the formation of our solar system, are composed of many of the necessary resources we need today and in the future.

The most abundant asteroids are C-type (carbonaceous) asteroids and make up about 75% of all known asteroids (Figure 1). C-type asteroids are thought to be composed of clay and silicate rocks, as well as potentially containing water.

The second most abundant asteroids are S-type (siliceous) asteroids, making up about 17% of the known asteroids. They are mainly composed of iron and nickel.

The third most common, and perhaps the most important, are M-type (metallic) asteroids (Figure 2). These asteroids are made of the same heavy metals which
constitute Earth’s core. These also include valuable metals such as gold, platinum, and silver, as well as valuable metals used in technology such as Palladium, Rhodium, and Iridium.

Each Type Has Important Uses

The most common asteroid type, C-type asteroids, potentially contain an abundance of water [1]. Not only is water essential to sustaining any sort of life in space, but water can also be used as potential propellant.

Propellant weight is a real issue, especially in the space missions we conduct today. To launch an object into space, some rockets require upwards of 80% of their mass to be composed of fuel just to escape Earth’s gravity well. If we can remove the fuel required to leave Earth from the equation, we can downsize our spacecraft, as well as cut back on propellant expenses needed to travel from asteroid to asteroid.

Speaking of building space craft, we can use the metals available from asteroids to build our future space structures. Be it spaceships or even future moon bases, we can simply bring the material over in a near-weightless environment as opposed to spending the resources needed to bring the materials up from Earth. We need only pay the initial cost of bringing the tools required to make more tools from Earth.

The last important materials mentioned, and perhaps the most important in modern technology, are metals such as palladium and other rare earth metals. Certainly, rare-earth metals are not known as such due to their amount in the Earth’s crust, but rather for the difficulty at which large deposits of those minerals may be found. Because metallic asteroids are highly concentrated, potentially large deposits of these rare earth metals can be brought back and used in electronics and other tools on Earth.

Not all Sunshine and Rainbows

Asteroid mining is certainly not a new concept, and companies in the last decade were created to try and exploit asteroid resources. Yet, they ultimately failed.

Does this mean that asteroid mining is not actually feasible? Not necessarily. Asteroid mining, especially with the lack of infrastructure to process these materials, is incredibly expensive. And owing to its risky nature, governments are unlikely to invest funding into such projects. This ultimately leaves the private sector to invest projects and the near-term profitability would be of importance. Since the companies lacked
viable customers for the next couple decades, funding ultimately dried up [2].

So, no active companies may be taking a crack at the idea for now, but the potential exists, and may be taken up again in the future, when Earth’s own resources may no longer keep up with demand, or if space travel becomes of greater importance.

Sources:
