

## Re: the un-economics of space travel

**Source:** <http://sci.tech-archive.net/Archive/sci.space.policy/2005-01/3246.html>

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**From:** Fred J. McCall (*fmccall\_at\_earthlink.net*)

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henry@spsystems.net (Henry Spencer) wrote:

:In article <1107009290.823533.210790@f14g2000cwb.googlegroups.com>,

:Alex Terrell <alexterrell@yahoo.com> wrote:

:>That can't be the whole story - estimated extraction energies\* are:

:>Al2O3 -> Al 28KWh/kg 0.90

:>TiO2 -> Ti 15KWh/kg 0.69

:>Yet aluminium is much more widely used...

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:Energy isn't the full story in this case. If the process for extracting  
:titanium was as simple and straightforward as the electrolytic process for  
:aluminum, titanium would be much more widely used. Titanium extraction is  
:complicated and difficult, in addition to being energy-intensive. (It  
:doesn't help that titanium's properties are quite sensitive to impurities,  
:so the purity requirements are severe.)

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:There was a recent report of successful development of an electrolytic  
:process for titanium. We'll see.

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:>Titanium is also difficult to work...

:>...And performance wise, it's not that much better than

:>Aluminium/lithium alloys, and for many applications not as good as

:>Carbon Fibre.

:

:It would nevertheless have a fair range of uses, if it were cheap.

But still not as much as one might think. It is inordinately  
difficult to work with and tend to eat machine tools.

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"Millions for defense, but not one cent for tribute."

-- Charles Pinckney