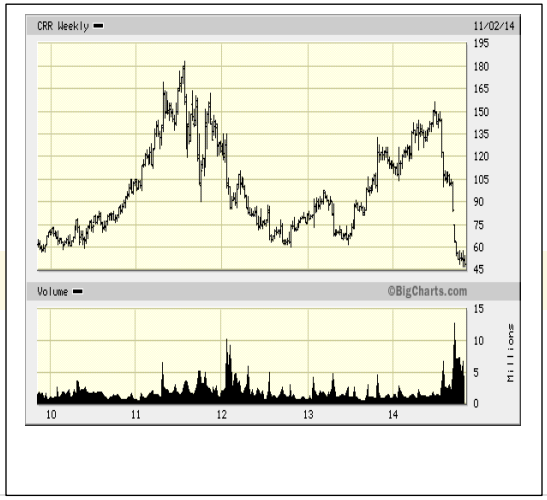
# CARBO CERAMICS INC CRR S

**March 28, 2014** by Siren81

| | | | 2014 | 2015 |
|---|---|---|---|---|
| Price: | **135.50** | EPS | $3.67 | $4.40 |
| Shares Out. (in M): | 23 | P/E | 36.9x | 30.8x |
| Market Cap (in M): | 3,130 | P/FCF | 0.0x | 0.0x |
| Net Debt (in M): | -90 | EBIT | 125 | 156 |
| TEV: | 3,040 | TEV/EBIT | 24.3x | 19.5x |







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## Description

**Investment Thesis** – CARBO Ceramics common stock is a **short** because:

¦ High returns and no barriers to entry are causing rapid supply increases in CARBO's market

¦ This increased supply will soon cause prices to fall as lower-cost domestic supply replaces higher-cost imports

¦ Even if prices do not fall CARBO is overvalued

**Business Overview**

CARBO is the world's largest producer of **ceramic proppant** used in hydraulic fracking of oil and gas wells. As the company's 10-k explains "The hydraulic fracturing process consists of pumping fluids down a natural gas or oil well at pressures sufficient to create fractures in the hydrocarbon-bearing rock formation. A granular material, called proppant, is suspended and transported in the fluid and fills the fracture, "propping" it open once high-pressure pumping stops. The proppant-filled fracture creates a conductive channel through which the hydrocarbons can flow more freely from the formation to the well and then to the surface". Sand accounts for about 89% of all proppants used, with resin-coated sand at 7% and Ceramic proppant at only 4%. Ceramic is by far the most expensive option costing 6-9x more than sand, **but can provide better returns to drillers in certain geologies.**

**Excess Returns are Available to Market Entrants with No Barriers to Entry**

There are no barriers to entry into the ceramic proppant market. Indeed, two new companies (Shamrock Proppants and CoorsTek) will begin producing this year. The required raw materials (Kaolin or Bauxite) are widely available and the manufacturing / distribution process is rather simple. A ceramic proppant plant takes about 1.5-2 years to build and costs approximately $0.33/lb of capacity. Using current pricing and cost data yields an all-in after-tax return of approximately 16-28% as shown below.

Figure 1: Ceramic Proppant Economics

| **Project Assumptions** | | **Unlevered Returns** | | **Levered Returns** | |
|---|---|---|---|---|---|
| Plant size (mm lbs.) | 500 | | | Cost of project debt | 5.0% |
| Capital expenditure per pound | $0.33 | Gross margin | 55 | Debt to total cap | 50.0% |
| Total capex | 165 | G&A (5% of sales) | 8 | | |
| Working capital (25% of sales) | 40 | Pre -tax profit | 47 | Pre -tax profit | 47 |
| Total investment ($mm) | $205 | Taxes (32%) | 15 | Interest | 4 |
| | | Net income | 32 | Taxes (32%) | 14 |
| Revenue per lb. | $0.32 | | | Net income | 29 |
| Cost per lb (including maint capex) | $0.21 | **Unlevered ROI** | **16%** | | |
| | | | | **Levered ROE** | **28%** |

**Prices are Currently Set by High-Cost Chinese Imports**

As in all commodity markets, prices for ceramic proppant are set by the high-cost producer which in this case is imports from China. Ceramic proppant manufacturing involves little labor, but requires natural gas as a feedstock. Since the U.S. has much lower natural gas prices than China, Chinese and U.S. producers have very similar production costs. However, shipping from China to the U.S. costs about $0.09 - $0.10/lb. so the delivered cost for Chinese producers is much higher.

**It should not be surprising that the difference in Chinese producers' costs relative to U.S. producers is almost exactly equal to CRR's gross margin.** Since there is significant excess capacity in China, Chinese producers are willing to ship to the U.S. at minimal profit. Thus, the market price is about equal to Chinese's producers' costs as that is the lowest price required for Chinese firms to supply the market. Since CRR's cost are about $0.10/lb. lower than the delivered cost for Chinese producers it is also about $0.10/lb. lower than the market price and that is CRR's gross margin.

**Rapidly Increasing Supply Will Soon Displace Imports**

Basic economic theory contends it is impossible to sustain excess profits without barriers to entry because firms will increase supply in order to capture any excess profits thus driving down prices. **This is exactly what is happing in CRR's market.** Since a ceramic proppant plant takes about 1.5-2 years to build, we have a fairly good idea of how much industry supply will be increasing in the next couple of years. As shown if figure 2 below, domestic capacity is expected to increase over 60% in the next two years. Even assuming healthy demand growth of 11% annually, this supply growth will soon eliminate the need for imports into the U.S. As such, the high-cost supplier will no longer be Chinese imports and the new high-cost supplier in the market will have a much lower marginal cost. This will cause prices to fall substantially impacting CRR's profits.

Figure 2: Domestic Ceramic Proppant Supply-Demand Forecast

| **2013 Ending U.S. Capacity** | | **U.S. Supply Increase 2014-2015** | | | |
|---|---|---|---|---|---|
| CRR | 1550 | CRR | 500 | | |
| Saint-Gobain | 565 | Imerys | 450 | 2015E ending capacity | 3,755 |
| Imerys | 220 | Shamrock | 120 | 2015E assumed demand (2) | 3,739 |
| Current supply | 2,335 | CoorsTek | 150 | **Import requirements** | **(16)** |
| Imports | 800 | Saint-Gobain | 200 | | |
| Total demand (1) | 3,035 | Total increase | 1,420 | | |

(1) Does not add up because assumes new Saint-Gobain unit did not produce at capacity
(2) Assumes demand grows 11%/yr based on conversations with industry sources

**Replacement Cost Analysis Supports Thesis**

As shown in figure 3 below, the market currently values CRR at approximately 2.5x replacement cost. Economic theory requires that in the absence of barriers to entry, the value of a business's normalized earnings should equal its replacement cost. Since there are indeed no barriers to entry here, the fact that CRR trades well in excess of replacement cost supports the view that the company is over-valued.

Figure 3: CRR Replacement Cost

| | **Volume (mm lbs)** | **Unit cost** | **Replacement cost** |
|---|---|---|---|
| 2014E year-end ceramic capacity | 2,000 | $0.33 | 660 |
| Coated sand capacity | 400 | $0.11 | 44 |
| Regular sand capacity | 650 | $0.02 | 15 |
| Other assets (transportation) | | | 100 |
| Intangible assets (1yr of G&A) | | | 65 |
| Net working capital (incl. cash) | | | 304 |
| **Total** | | | **1,188** |

| | |
|---|---|
| **Per share** | **$51.43** |

**Even if Prices Do Not Fall, CARBO is Overvalued**

Lets assume that I'm wrong and prices for CRR's product never fall while CRR is able to expand indefinitely at currently available returns. In this case, **CARBO would be worth the perpetuity value of the company's current earnings plus the value created by all growth in the future. As shown in figure 4 below, even if you assume CRR is able to invest $50mm of equity per year (about equal to 250mm lbs. of capacity) at 28% levered ROEs, CRR's equity is only worth about $105/share – well below the current market price.**

Figure 4: CRR is Overvalued Even if Prices Do Not Fall

| | | | |
|---|---|---|---|
| | | Equity investment per year | 50 |
| 2014E EBITDA | 208 | Net value created by 1yr investment (28% levered ROE) | 71 |
| - Maint capex | 50 | Total value of growth option (9% cost of capital) | 786 |
| - Taxes (32%) | 50 | | |
| NOPAT | 107 | + excess cash | 90 |
| Perpetuity value of current business (9% cost of capital & 2% growth) | 1,532 | **Total equity value** | **2,408** |
| | | **Per share** | **$104** |

**Risks**

*Increases to Chinese Producers' Costs* – As discussed earlier, market prices for ceramic proppant in the U.S. are currently set by Chinese producers' costs. As such, anything that increases these costs but does not impact CRR (such as Bauxite prices, freight rates from China, Chinese natural gas prices, etc.) would increase market prices and thus CRR's profitability. However, this impact would only effect the market until Chinese imports are displaced. Since we only expect the U.S. to import ceramic proppant from China for the next couple years, the long-term impact from an increase in Chinese producers' cost would be minimal.

*Greater-than-Expected Demand Growth* – Demand ultimately depends on several factors such as commodity prices, shale formations and drilling techniques that cannot be estimated with high conviction. As such, it is possible demand grows materially faster than anticipated. However, even if demand grows at 20% per year in 2014 and 2015 (nearly double our estimate of 11% growth) the level of imports in to the U.S. would still fall. Thus, even in this case it is unlikely prices would actually increase. Furthermore, faster demand growth does not refute the thesis; it merely would take longer to play out. Therefore I view this risk as acceptable.

*Project Completions* – There is no guarantee that the planned supply increases will ever be completed, as even in-construction developments can always be stopped. However, the only plausible reason for this expanded capacity not to materialize would be a change in the underlying economics of the industry. If industry economics deteriorate fast enough to kill expansion projects, CRR' business will be similarly impacted, and the short position will profit even faster.

## Catalyst

Lower proppant prices and lower earnings
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Questions:

have never traded in CRR, but I do own a bunch of ROSE so I have casually followed the company and met with CRR management several times.

The short has worked, but why? ROSE was 10% of ceramic volumes, mainly due to activity in their Gates Ranch acreage in the Eagle Ford. They put out an SPE paper together with CRR a few years ago touting the virtues of ceramic. For a long time they were a staunch supporter of the product, and even until a few months ago they remained committed to it. **Then on August 4 after the market closed they announced they were switching to sand. CRR fell 13% the next day.**

Also, the rollout of their deepwater product keeps getting pushed to the right. Combine these fundamental factors with cult-like valuation multiples and the stock was ripe for an implosion - assuming you could have anticipated these developments as an outsider.

Back to the main thesis - **has anything happened to prove or disprove the replacement cost argument?**

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Chinese delivered costs are closer to the low 30's. CRR's cost is in the low 20's. **The difference is CRR's GM of about 0.11-0.12/lb.**

A number of difference sources verified the 3b lb market size. I could be somewhat off, but pretty sure I'm close.

On kryptosphere – It seems like the applications for this are limited. Even if it is successful I don't see anything stopping others from offering similar products.

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The Imerys capacity relates to the recent PyraMax acquisition that will begin producing this year. I've not included any possible expansions the company has discussed.

http://www.imerys.com/scopi/group/imeryscom/imeryscom.nsf/pagesref/NDEN-96MLT3/$File/ImerysPRinvestUS110413.pdf
The Saint Gobain capacity does not refer to a specific announced project, but people I spoke with believed the company is working on something that will be producing next year.

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All the consultants or industry professionals I spoke with had demand growing 10-12% for the next two years. While there are several factors that influence demand that are difficult to forecast, drilling activity should be at least somewhat predictable in the near term, so I don't think demand will be much higher than this.

Sand use has grown faster than ceramic for a while now causing ceramic share of total proppant use to fall from 13% in 2006 to 4% now.

One reason I like this idea is even if demand grows as much as 23% annually for the next 2 years, the level of imports would be unchanged. As such, even in this scenario it seems unlikely prices would rise by much and if prices never fall, CRR still appears overvalued.