

MONTREAL, QUEBEC--(Marketwired - Nov 2, 2016) - [HPQ Silicon Resources Inc.](#) ("HPQ") (TSX VENTURE:HPQ)(FRANKFURT:UGE)(OTC PINK:URAGD) is pleased to inform its shareholders that it has received from PyroGenesis Canada Inc ("PyroGenesis") a stage report¹ pertaining to Silicon Metal recently produced by the *PUREVAP&trade*; QRR.

The analysis demonstrates that the PUREVAP™ QRR is capable of using SiO₂ feed material that does not even meet the minimal industry specification to make Ferrosilicon² and produce Silicon Metal (Si) of greater purity than what can be achieved by traditional processes used to make Metallurgical Grade Silicon Metal (98.5% to 99.5% Si)³ today.

"To say that we are excited with reaching this major milestone so early in the testing process is an understatement. We have always believed that we would eventually attain this critical goal, but reaching it now, using the first generation setup of the lab-scale PUREVAP™ QRR has again exceeded our expectations. This further validates our belief that a one step direct transformation of Quartz into High Purity Silicon Metal will be a disruptive process that could eventually impact the entire Silicon Metal industry," said Bernard Tourillon, Chairman and CEO of HPQ-Silicon.

"Being capable of using low purity feedstock and achieving these results represents another major milestone reached on our road to transform HPQ Silicon Quartz (SiO₂) into high Purity Silicon Metal (Si)," said P. Peter Pascali, President and CEO of PyroGenesis, "and each one of the milestones reached increases the probability that the PUREVAP™ QRR One Step process will eventually become the Gold Standard process for the production of High Purity Silicon Metal."

TEST KEY PARAMETERS

PyroGenesis' process characterization program⁴ was started to fulfill the following key objectives: 1) studying the *PUREVAP&trade*; process thoroughly; 2) collect data for the design of the pilot scale unit; and 3) implement the pathway to higher purity, up to Solar Grade Silicon Metal "SGSi".

Since it is typically easier to measure and discriminate differences in impurity levels at high concentration than at trace levels, it was decided that the best technical procedure was to use sub-standard grade quartz² with relatively high levels of impurities to conduct the first portion of the process characterization tests.

¹ PyroGenesis Technical Memo: "TM-2016-762, - PureVap Process Characterization -Update on the SEM-EDS-WDS analyses conducted at the CM2".

² <http://www.sidex.ca/wp-content/uploads/2015/02/Exploring-for-Silica-in-Quebec.pdf>

³ <http://pyrometallurgy.co.za/Pyro2011/Papers/083-Xakalashe.pdf>

⁴ HPQ Silicon PR Dated September 1, 2016

As a result, during this phase of testing, lower purity quartz was used as feedstock compared to the approximately 99.99 SiO₂⁵ material used during phase 1 test, in order to obtain better resolution on impurity removal happening in the *PUREVAP&trade*; QRR process.

Table 1- General specifications for different uses of silica and Quartz data from Lot #a16-07056

	Min. SiO ₂ (wt%)	Max. Al ₂ O ₃ (wt%)	Max. Fe ₂ O ₃ (wt%)	Max. TiO ₂ (wt%)
Silicon:				
- Metal	99.5	0.2	0.1	0.006
- Chemical	99.8	0.1	0.05	0.005
Ferrosilicon	98.7	0.6	0.3	0.05
http://www.sidex.ca/wp-content/uploads/2015/02/Exploring-for-Silica-in-Quebec.pdf				
Quartz lot #A16-07056	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂
Martinville	97.57	0.51	0.34	0.018
Actlabs, located in Ancaster, Ontario, ICP-AES analysis				

The feedstock for the experiment was a 5:1 (weight basis) mixture of Quartz lot #A16-07056 from Martinville and activated carbon #5566 provided by Asbury Carbon. Impurity levels in the resulting mixture were relatively high, with Al, Ca and Fe around 2,000 ppm, especially considering that Fe is an element that is hard to remove.

Table 2 - Impurity levels for the Quartz, the Carbon and the resulting Mixture

Material	Quartz	Carbon Mixture
#ID	A16-07056	5566 5:1 m/m
Units	(ppm)	(ppm) (ppm)

Al	2699	337	2305
Ca	1858	2848	2023
Fe	2378	39	1988
Mg	965	131	826
Mn	124	2	104
Na	297	184	278
K	249	229	246
Ti	108	2	90
P	44	215	72
S	100	204	117
W	1	0	1
B	4	3	4

⁵ March 3, 2016 Press Release

The Quartz and the Carbon were both analyzed using a combination of ICP-AES and ICP-MS by third-party laboratories. The impurity concentrations of the mixtures are obtained using a weighted average of the ones of the reagents in respect to their mass ratio (5:1).

RESULTS

Given this approach, the silicon metal produced in the second phase of testing was not expected to reach the 98.5% Si standard purity level for Metallurgical Grade Silicon Metal (MG Si), as it is generally accepted that when making Silicon Metal using traditional process, feedstock purity is crucial as it has a direct effect on the final product purity.

However, this is definitely not the case with the *PUREVAP®* QRR process, as overall impurity removal efficiency of 92 % on average was reached and Si with a mean purity of 99.936 %⁶ was produced.

As shown in Table 3 the comparison in impurity contents between the feedstock mixture and the silicon metal product were tabulated. Really notable are the results for Fe and Ti, which are impurities that are challenging to eliminate using traditional methods.

Table 3 - Comparison of the impurity levels in the feedstock versus in the Silicon product

Material	Feedstock Mixture	Silicon product	Diff	
Units	(ppm)	(ppm)	(%)	
Al	2305	70	-97	%
Ca	2023	10	-100	%
Fe	1988	210	-89	%
Mg	826	30	-96	%
Mn	104	70	-32	%
Na	278	0	-100	%
K	246	50	-80	%
Ti	90	30	-67	%
P	72	40	-45	%
S	117	10	-91	%
W	1	120	14300	%
B	4	0	-100	%
Total	8054	640	92	%

All the impurities were massively removed except for tungsten. Also it is noteworthy that the contents of Boron (B), and Phosphorus (P) were greatly reduced in this round of testing. As previously reported, these are important elements that negatively impact on silicon metal.

⁶ Analyzed using Wavelength-Dispersive Spectroscopy (WDS), which can provide quantitative analyses of precise spots with a detection threshold of approximately 10 ppm (weight basis). Detection limit of the process implies that 0 reading is fact a < 10 ppm

"We are extremely pleased with the progress to date," said Pierre Carabin, CTO of PyroGenesis. "Particularly, when one considers today's results in light of our press release dated September 29, 2016, wherein we announced, amongst other things, that the *PUREVAP®* process can remove one of the toughest impurities on the road to solar grade silicon, namely boron, from the

final material produced. It seems that we are truly on to something unique."

As shown in Table 4, from the 5 different locations analyzed on the sample, all of them were of a purity of 3N+ (99.9+ %) with a mean purity of 99.936 %⁴. The main contaminants were iron (Fe) and tungsten (W) with 0.021 % and 0.012 % respectively in average.

Interestingly, the concentrations were below the detection limits for 2 locations out of 5 for iron and 3 out of 5 for the tungsten. It has been observed that Tungsten was measured in relatively high concentration in two locations out of five. It is too early to say if this is due to concentration during the process or if it is due to a contamination. These two avenues will be further investigated shortly.

Table 4- Elementary concentration in % of the sample at 5 locations⁴

	Location 1	Location 2	Location 3	Location 4	Location 5	Average
Elements	(%)	(%)	(%)	(%)	(%)	(%)
W	0.039	0.000	0.022	0.000	0.000	0.012
Fe	0.000	0.020	0.000	0.044	0.043	0.021
Mn	0.000	0.009	0.010	0.014	0.000	0.007
Ti	0.003	0.000	0.000	0.004	0.007	0.003
Ca	0.000	0.002	0.001	0.002	0.000	0.001
K	0.005	0.004	0.006	0.003	0.009	0.005
S	0.004	0.000	0.000	0.000	0.000	0.001
P	0.001	0.000	0.004	0.011	0.002	0.004
Si	99.931	99.955	99.953	99.906	99.936	99.936
Al	0.013	0.006	0.004	0.010	0.002	0.007
Mg	0.004	0.004	0.000	0.005	0.001	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000
C	0.000	0.000	0.000	0.000	0.000	0.000
B	0.000	0.000	0.000	0.000	0.000	0.000

FURTHER INFORMATION ON THE TEST

During phase 1 - Proof of concept test, the produced silicon was only collected at the surface of the graphite electrode. Now, during phase 2, not only is silicon produced at the surface of the electrode, but is also produced in bulk at the bottom of the crucible. The current analyses were conducted on the bulk produced at the bottom of the crucible.

The lab testing is still ongoing and the project is still on schedule for a mid-January 2017 completion. By the end of the Process Characterization phase, PyroGenesis expect to have conducted between 40 and 50 laboratory scale experiments. The data collected during the

Process Characterization phase will be used for the Pilot Scale design, which is also currently underway.

Testing Methodology:

Scanning electron microscopy (SEM), Energy Dispersive X-ray Spectroscopy (EDS), and Wavelength-Dispersive X-Ray Spectroscopy (WDS) analysis were completed at the Centre de Caractérisation Microscopique des Matériaux (CM²), located at the École Polytechnique de Montréal.

Pierre Carabin, Eng., M. Eng., has reviewed and approved the technical content of this press release.

About HPQ Silicon

[HPQ Silicon Resources Inc.](#) is a TSX-V listed junior exploration company planning to become a vertically integrated and diversified High Value Silicon Metal (99.9+% Si), and Solar Grade Silicon Metal (99.9999% Si) producer.

Our business model is focused on developing a disruptive High Purity and Solar Grade Silicon Metal manufacturing process (patent pending) that can generate high yield returns and significant free cash flow within a short time line.

Disclaimers:

This press release contains certain forward-looking statements, including, without limitation, statements containing the words "may", "plan", "will", "estimate", "continue", "anticipate", "intend", "expect", "in the process" and other similar expressions which constitute "forward-looking information" within the meaning of applicable securities laws. Forward-looking statements reflect the Company's current expectation and assumptions, and are subject to a number of risks and uncertainties that could cause actual results to differ materially from those anticipated. These forward-looking statements involve risks and uncertainties including, but not limited to, our expectations regarding the acceptance of our products by the market, our strategy to develop new products and enhance the capabilities of existing products, our strategy with respect to research and development, the impact of competitive products and pricing, new product development, and uncertainties related to the regulatory approval process. Such statements reflect the current views of the Company with respect to future events and are subject to certain risks and uncertainties and other risks detailed from time-to-time in the Company's on-going filings with the securities regulatory authorities, which filings can be found at www.sedar.com. Actual results, events, and performance may differ materially. Readers are cautioned not to place undue reliance on these forward-looking statements. The Company undertakes no obligation to publicly update or revise any forward-looking statements either as a result of new information, future events or otherwise, except as required by applicable securities laws.

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