

MONTREAL, QUEBEC--(Marketwired - Nov 29, 2016) - HPQ Silicon Resources Inc. ("HPQ") (TSX VENTURE:HPQ)(FRANKFURT:UGE)(OTC PINK:URAGD) is pleased to inform its shareholders that PyroGenesis Canada Inc ("PyroGenesis") has just submitted a new stage report(1) pertaining to High Purity Silicon Metal test results recently produced using the first generation setup of the lab-scale *PUREVAP&trade*; QRR, combined with the addition of a purifying agent.

## ANALYSIS CONFIRMS PRODUCTION OF 4N+ SILICON METAL (99.99+% Si)

Multiple analyses of the material produced during test 19 were completed at the « Centre de Caractérisation Microscopique des Matériaux » (CM<sup>2</sup>), located at the École Polytechnique de Montréal using a Scanning Electron Microscope (SEM) associated with a Wavelength-Dispersive Spectroscopy (WDS).

The results from test 19 confirm production of 4N+ purity Silicon Metal (99.99+% Si). At this stage, the final purity level of the material in less than 100-ppm range (parts per million) has not been determined. Since this test was the last prior to the upgrades of the lab-scale *PUREVAP&trade*; QRR, these positive results will be incorporated into the plans for all-future testing in which samples will be routinely analyzed to much lower detection limits. R&D lab testing is still ongoing and the project is on schedule for completion in January 2017.

*"We have officially reached the 4N Milestone, and the technical team now can focus on the improvements to follow up the achievement of the 4N+ high grade silicon core. The PUREVAP&trade; QRR results once again exceeded our expectations at this early stage of development testing. The presence of a high grade core of material and the evidence of zonation in which impurities are forced to the outside is exactly what we were working toward, and this result has come earlier than expected. In addition, production of 99.99+% Si using 98.14% SiO<sub>2</sub> feed speaks volumes about the economic opportunities that the PUREVAP&trade; QRR represents for HPQ-Silicon and its numerous high grade quartz deposits, in our objective of becoming vertically integrated" said Bernard Tourillon, Chairman and CEO of HPQ-Silicon. "Furthermore, testing and process improvements are being made on a continual basis, as our goal of making Solar Grade Silicon gets closer to becoming a reality."*

## ANALYTICAL RESULTS INDICATE ZONATION PRODUCTION OF A HIGH GRADE SILICON CORE

More importantly, the analytical data points to directional crystallization of a core of higher purity silicon metal, as well as, zonation of the impurities as observed in other purification processes. This apparent zonation indicates that the *PUREVAP&trade*; process has now achieved a physical segregation of residual impurities at lab-scale stage. The groundbreaking importance of this is the initial production of a higher purity core section of the silicon material, which is where the targeted 6N silicon would be expected to accumulate in the future. This core of high purity silicon material would then be extracted and sold as solar grade silicon. The less pure portions, where the impurities have migrated, would then be separated and sold as high value Silicon Metal by-products.

## FURTHER CHARACTERIZATION OF IMPURITIES TO FOLLOW

The WDS analytical method provides quantitative analyses of precise spots with a detection threshold of approximately 0.01%, or 100 ppm (weight basis). The results confirm impurity levels to as low the detection limit of 0.01% (< 100 ppm) for almost all the major impurities. This positive result means that going forward material produced from ongoing test work, which will focus on improvements to the purification process and adaptation to the Pilot Plant development, will now be sent for detailed analysis and characterization of the impurities, in less than 100 parts per million (ppm) range, to fully evaluate the effectiveness of the *PUREVAP&trade*; QRR.

*"We are extremely pleased with the progress to date," said Pierre Carabin, CTO of PyroGenesis. "We have now reached the detection limits of two analysis methods and confirmed the ability of the process produce silicon metal of at least 99.99+% purity. This confirms that we are truly on to something unique."*

## TEST KEY PARAMETERS

The feedstock for experiment #19 was 300 g of a mixture 2.5:1 weight basis of 2-4 mm Quartz lot #A16- 09153 from Ronceveaux and activated carbon #5566 provided by Asbury Carbon. The overall purity of the Quartz is evaluated at 98.14 %.

Table 1 - Impurity levels for the Quartz, the Carbon and the resulting Mixture

Material	Quartz	Carbon	Mixture
#ID	A16-09153	5566	2.5:1 m/m
Units	(ppm)	(ppm)	(ppm)
Al	265	337	285

Ca	71	2848	865
Fe	6,295	39	4,508
Mg	0	131	37
Mn	70	2	50
Na	148	184	158
K	0	229	66
Ti	12	2	9
P	0	215	61
S	0	204	58
W	0	0	0
B	5	3	4

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 a weighted average of the ones of the reagents in respect to their mass ratio (2.5:1). It can be noted that the impurity levels in the resulting mixture are relatively high, especially in iron, which is a difficult element to vaporize.

## RESULTS

As shown in Table 2 below, 4 of the 5 different locations analyzed on the sample were of a purity of 4N+ (99.99+ %) with a mean purity of 99.99 %. The main contaminants were Aluminum (Al) and Phosphorus (P) with 0.008 % and 0.002 % respectively in average. Interestingly, the concentrations were below the detection limits for all the other contaminants for all locations.

Table 2- Elementary concentration in % of the sample at 5 locations

Elements	Location 1	Location 2	Location 3	Location 4	Location 5	Average
	(%)	(%)	(%)	(%)	(%)	(%)
Si	99.99	100.00	99.99	99.99	99.98	99.99
Al	0.01	<0.01	<0.01	0.01	0.02	0.008
P	<0.01	<0.01	0.01	<0.01	<0.01	0.002
W	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
Fe	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
Mn	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
Ti	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
Ca	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
K	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
S	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
Mg	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
Na	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
C	<0.01	<0.01	<0.01	<0.01	<0.01	0.000
B	<0.01	<0.01	<0.01	<0.01	<0.01	0.000

*"These results are significant as the prevailing proposition suggests that the quartz purity level required to make high purity silicon metal is over 99.5%(2)" said P. Peter Pascali, President and CEO of PyroGenesis. "The PUREVAP® has proven that to no longer be the case. We have demonstrated that the process can produce high purity silicon metal from significantly lower purity quartz as feedstock. The implications of this are enormous when considering the potential commercial applications of the process. Conceivably, we can now take a cheap and abundant low purity quartz feedstock and transform it into a high value end product."*

## 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, not only is silicon produced at the surface of the electrode, but is also accumulated at the bottom of the crucible.

Figure 1 - <http://www.marketwire.com/library/20161128-800Photo1078160.jpg>

The R&D lab testing is still ongoing and the project is on schedule for a January 2017 completion. By the end of the Process Characterization phase, PyroGenesis expects 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 (CM<sup>2</sup>), 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) and becoming a vertically - integrated Solar Grade Silicon producer that can generate high yield returns and significant free cash flow within a relatively 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](http://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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- (1) PyroGenesis Technical Memo: TM-2016-765, Rev. 00, "Mass balance on impurities for test 19"
- (2) Please refer to HPQ -Silicon Resources Inc and PyroGenesis Canada Inc November 2, 2016 press releases

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