Archer Materials Limited (ACN: 123 993 233)
Lot Fourteen, Frome Road, Adelaide SA 5000
www.archerx.com.au

ASX Announcement (ASX: **AXE**) 21 October 2021

First Quarter Activities Report

For the three months ending 30 September 2021

Significant Activities

- Archer is now a pure play semiconductor company with a focus on developing the Company's ^{12}CQ quantum computing chip.
- The Company is well capitalised with approximately $29.4 million cash and no debt.
- Archer is one of few companies in the semiconductor industry with patents protecting qubit processor chip technology with patents related to the ^{12}CQ chip granted during the Quarter in the US, China, and South Korea.
- Significant technological progress made in ^{12}CQ chip development with the first indication of on-chip qubit control.
- Archer's 100% owned patent application related to its graphene-based biochip technology progressed during the Quarter.
- Completion of the sale of the mineral exploration business allows Archer to change its GICS code to "Semiconductors" and seek inclusion in the S&P/ASX All Technology Index.

Archer Materials Limited ("Archer", the "Company", "ASX: **AXE**") is pleased to report on its activities for the three months ending 30 September 2021 ("Quarter").

Commenting on the first quarter activities, Greg English, Executive Chairman of Archer, said, "This past Quarter was possibly the most important in the Company's history as we completed the transition to a pure-play deep technology company.

Although the sale of the mineral exploration business to iTech Minerals Ltd didn't complete until after the end of the Quarter, all the hard work was done during the Quarter. We hope that a change of our GICS code to "Semiconductors" will provide us with the opportunity to be admitted to the S&P/ASX All Technology Index.

"The recent COVID-19 restrictions in NSW has limited our access to the laboratories and facilities required to develop the ^{12}CQ quantum computer chip and the biochip. However, we were able to announce significant progress with the ^{12}CQ quantum computer chip within days of the COVID-19 restrictions lifting. We expect to make further progress with both technologies in Q2.

"During the Quarter we completed a share placement to sophisticated and professional investors and a share purchase plan. Our ^{12}CQ quantum computer chip technology development is unique and with the recent grant of the US patent we have plans to expand overseas. The funds raised ensure that we will have the ability to hire the people and access the labs required to grow the Company."

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Quarterly Activities to 30 September 2021

Archer is a technology company that operates within the semiconductor industry. The Company is developing and commercialising advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics. The Company is progressing the development of its ^{12}CQ quantum computing qubit processor chip ("^{12}CQ chip") and 'lab-on-a-chip' biochip technology ("biochip").

Technology development and commercialisation activities

^{12}CQ Chip

Archer's ^{12}CQ is a world-first qubit processor technology the Company is developing that would allow for mobile quantum computing powered devices. During the Quarter, Archer made significant technology development progress towards on-chip qubit control (ASX ann. 12 Jul 2021) reporting the first indication of on-chip qubit control in microscopic-scale qubit material.

For the first time, Archer recorded the Continuous Wave Electron Spin Resonance ("cw-ESR") signals arising from a specially fabricated superconducting on-chip resonator semiconductor device integrating *microscopic* quantities of qubits (Image 1). Initial results indicated the obtained on-chip cw-ESR signal signature was characteristic of the qubit material.

Importantly, the on-chip cw-ESR signal signature was found to be in excellent agreement with the well-studied, repeatable, and scientifically published signal obtained from room-temperature measurements performed on *macroscopic* ('bulk') quantity qubits using cw-ESR instruments[1].

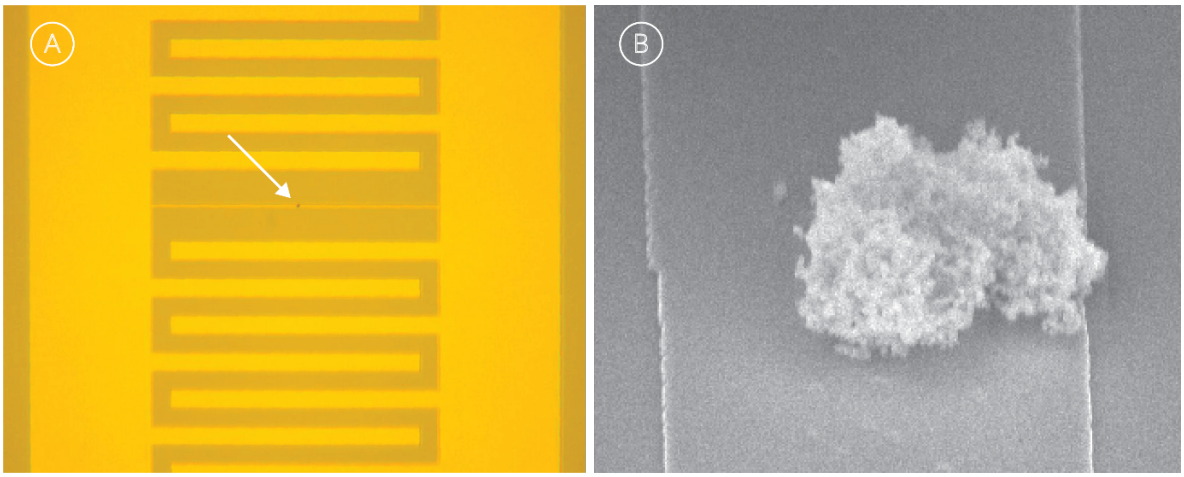

Image 1. Measuring quantum information residing on qubit materials using chip devices. A An example of a specially fabricated superconducting on-chip resonator semiconductor device. Arrow points to a dark spot indicative of a microscopic qubit cluster quantity (magnified in **B**) ten times smaller than the width of a human hair. The superconducting operating temperatures of the device are unrelated to Archer's qubits' potential to operate at room temperature. **B** The ultraprecise placement of a microscopic cluster of qubit material on a cw-ESR signal detection area. Individual qubits are not visible at the image magnification.

[1] https://www.nature.com/articles/ncomms12232

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With the early indication of on-chip qubit control the Company's ^{12}CQ quantum computing chip technology development continues and is on track towards achieving '*qubit control*' under various qubit environments, including few and single qubits. Device fabrication and characterisation measurements are being performed by Archer staff at various lab facilities.

During the Quarter, Archer had patents related to the ^{12}CQ chip granted in South Korea (ASX ann. 10 Aug 2021) and China (ASX ann. 11 Aug 2021), and reached its most significant early-stage commercial milestone with the granting of the US patent (22 Sept 2021). The granting of the patents during the Quarter is a significant step in the Company's efforts to access global markets (Exhibit 1).

Patent protection in these countries is required for any future commercial operations in the respective countries, and the Company considers China, South Korea, and the US as critical strategic jurisdictions to protect and commercialise its IP. Archer will need patent protection in the world's largest global economies if the Company is to participate in the semiconductor industry.

The US Patent (Patent No. 11126925) protection provides Archer with access to the world's largest economy to exploit IP rights related to the ^{12}CQ chip and is a significant step in the Company's efforts to participate in the US technology economy. The US leads the world in digital legal frameworks and incentivises long-term investments in research, innovation, and invention.

The US has announced that quantum technology and the semiconductor industry are key priorities of investment in the US for its global technology leadership plans. The US recently entered into a trilateral security partnership with Australia and the UK called 'AUKUS'[2], with a focus that includes quantum technologies. The US has also passed into law the National Quantum Initiatives Act[3], and introduced the Innovation and Competition Act ("ICA")[4].

The Chinese Patent (Patent No. 4606612) protection gives Archer access to the world's second largest economy to exploit IP rights related to the ^{12}CQ chip. China has the world's largest population and market size, with over half a billion people using mobile devices in an economy that is transitioning from a low-cost manufacturer to a consumer of technology incorporating AI, autonomous systems, and blockchain[5].

In the commercialisation of Archer's ^{12}CQ chip, the Company will look to use existing chip manufacturing facilities to build the ^{12}CQ chip. Most of the world's chip manufacturing takes place in Asia. Archer must have patent protection in the relevant countries if the Company wants to utilise these chip manufacturing plants in the future.

The South Korean Patent (No. 10-2288974) protection is significant, as South Korea is a major global manufacturer and exporter of semiconductor chip devices, with its conglomerates, Samsung Electronics and SK Hynix, among the top producers of semiconductors in the world[6].

The patent application process and procedures for the additional patent applications in the jurisdictions of Australia, Europe, and Hong Kong are ongoing.

[2] https://www.pm.gov.au/media/joint-leaders-statement-aukus
[3] https://www.congress.gov/bill/115th-congress/house-bill/6227
[4] https://www.congress.gov/bill/117th-congress/senate-bill/1260
[5] World Economic Forum: China: Dynamic Briefing. Generated for Dr Mohammad Choucair, Archer Materials.
[6] https://www.abc.net.au/news/2021-07-25/new-arms-race-fuelled-by-global-chip-shortage/100202390

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Exhibit 1. Description of Archer's technology patents and patent applications

Priority Date	Technology Summary	Stage & Coverage	Patent/Application Number
3 Dec 2015	**A quantum electronic device.** Quantum electronic devices for processing qubits represented by an electron spin on a new type of carbon nanomaterial and methods for using this material in quantum computing.		
		Granted	
		Japan	6809670
		South Korea	10-2288974
		China	4606612
		United States of America	11126925
		Pending	
		Australia	2016363118
		Hong Kong	18115770.4
		Europe	3383792
15 Feb 2019	**Graphene complexes and compositions thereof.** Complexes comprising graphene compositions, methods of synthesising these complexes and compositions, and the use of these complexes and compositions in biomolecular sensing.		
		Stage & Coverage	Patent/Application Number
		Pending	
		Australia	2020220236
		United States of America	17429442

Patent Family
■ ^{12}CQ chip ■ Biochip

Exhibit 1. Archer is one of few companies in the semiconductor industry with a patent portfolio protecting quantum computing chip technology. As of 30 September 2021.

Archer's Biochip

Archer's biochip is a unique graphene-based biotechnology that the Company is building to enable the complex detection of some of the world's most deadly communicable diseases. The largest technological barriers to commercialising such devices involve nanofabrication. This is the current focus of Archer in its biochip development (ASX ann. 22 Mar 2021). Archer has continued to strategically secure access to local institutional deep-tech infrastructure (ASX ann. 26 Apr 2021 and 11 Jun 2021).

During the Quarter, the Company's 100% owned patent application related to its graphene-based biochip technology progressed to the National Phase of the patent granting procedure and was filed in the US and assigned a US Application Number. The Company has also sought National Phase entry in Australia for the biochip related patent application (Exhibit 1) (ASX ann. 16 Aug 2021).

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Activity, divestment or otherwise sale of remaining mineral tenements

During the Quarter the Company updated shareholders on the sale of the Company's remaining mineral exploration tenements to iTech Minerals Ltd ("iTech") (ASX ann. 31 Aug 2021 and ASX ann. 1 Sept 2021). The iTech transaction was described in previous ASX announcements (ASX ann. 12 Apr 2021, 21 May 2021, 18 Jun 2021, and 19 Apr 2021).

Under the sale agreement with iTech, Archer has agreed to sell all of its remaining mineral exploration projects to iTech, in return for 50 million iTech shares (the "Transaction"), which Archer intends to distribute to Archer shareholders (the "In-Specie Distribution"). The Transaction and In-Specie Distribution were both subject to Archer shareholder approval at a meeting held at 10:00am (Adelaide time) on Monday, 30 August 2021 (the "Meeting"). At the Meeting, Archer shareholders approved the Transaction and In-Specie Distribution (ASX ann. 30 Aug 2021).

Events subsequent to the end of reporting date

On 4 October 2021 the Company announced that it had received firm commitments for A$15 million via an institutional placement of 10.3 million new fully paid ordinary shares at $1.45 a share. A non-underwritten share purchase plan ("SPP") to existing eligible shareholders to raise up to $5 million at $1.45 a share opened on 7 October 2021. Given the strong support from shareholders for the SPP, the Company announced on 18 October 2021, that it was increasing the amount to be raised under the SPP to $10 million and closing the offer early, on 20 October 2020.

On 14 October 2021 the Company announced that it had completed the sale of the Company's mineral exploration business to iTech Minerals Ltd. The Company no longer owns any mineral exploration tenements. Archer will seek confirmation of a change in GICS code from 'Materials - Diversified Metals & Mining' to 'Information Technology - Semiconductors'.

Corporate

Cash Balance

The Company's cash balance at the end of the Quarter was $5,380,000 which excludes the additional $25 million raised (before costs) after the end of the Quarter.

Exercise of Unlisted Options

During the Quarter, the Company received $270,060 from the exercise of unlisted options, of which the shares in respect of 1,200,000 options exercised during the quarter, were allotted subsequent to quarter end.

Retirement of Non-Executive Director

During the Quarter the Company announced that Dr Alice M^{c}Cleary, a founding director of the Company, will be retiring as a director at the 2021 Annual General Meeting. Alice retires from the Company for personal reasons, and the Board wishes Alice and her family the very best for the future. The Board acknowledges Alice's service to the Company over the last 14 years as a non-executive director and Chair of the Audit and Risk Committee. Alice has made a valuable contribution towards the growth and development of Archer and more recently has been involved in Archer's transition to a technology focussed company.

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Annual Report

The Company's Annual Report 2021 was lodged to ASX on 23 September 2021.

Shareholder Events and Outreach

During the Quarter, Archer attended the in-person Quantum Computing Summit held in London 22-23 September, which hosted leading quantum experts and companies from around the world. Archer staff also participated in the Quantum Hackathon which is hosted by The University of Queensland in partnership with Macquarie University, the Australian Government Department of Defence, and IBM Quantum.

The Company electronically distributed a number of Newsletters and News Spotlights to shareholders during the Quarter, including:

+ UK Quantum Computing Summit
+ Quantum Chip Patents Granted in Asia's Powerhouse Economies
+ Building Quantum Advantage
+ Quantum Gold Rush: The Private Funding Pouring Into Quantum Start-Ups
+ Archer Presses Forward with A Quantum Focussed Strategy

Archer CEO, Dr Mohammad Choucair, also gave interviews with Proactive Investor and other online webinars to shareholders and investors:

+ Archer Materials granted key US patent for quantum computing chip
+ Broker Briefing Webinar
+ Archer Materials welcomes Chinese patent for 12CQ quantum computing chip
+ Archer Materials secures South Korean patent for its quantum computing chip
+ Marcus Today - On the Couch With
+ CEO Investor Sessions Australia - Technology Webinar
+ ASX Investor - The Future of Quantum Computing

Mineral Exploration Disclosures

Archer's accompanying Appendix 5B (Quarterly Cashflow Report) includes amounts in item 6.1 which were executive and non-executive director fees paid as salaries and wages. During the Quarter the Company did not spend any funds on exploration activities.

The Company has previously reported the sale of all of its remaining mineral tenements to iTech Minerals Limited. The sale to iTech completed on 14 October 2021 and at the date of this report Archer does not hold an interest in any mineral tenements. However, at the end of the Quarter the Company owned a 100% interest in the following mineral tenements which were all held for sale to iTech: EL 6363, EL 5791, EL 5804, EL 5870, EL 6351, EL 5769, EL 5794, EL 5935, EL 6000, EL 6029, EL 6160, EL 6287, EL 6354, EL 6478, ML 6470, MPL 150 and MPL 151 all located in South Australia and EL 8894 and EL 8871 located in NSW.

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Issued Capital

Date	Shares	Options
Start of Quarter	227,506,546	14,518,277
New issues during Quarter	Nil	Nil
Exercised/forfeited during Quarter	200,000(1)	200,000(1)
End of Quarter	227,706,546	14,318,277
Date of this Report	239,251,374(2) (3)	13,118,277(2)

(1) 200,000 unlisted options, exercisable at $0.1929 on or before 31 March 2023, were exercised into shares. The unlisted options were previously issued under an employee incentive scheme.

(2) A further 1,200,000 unlisted options, exercisable at $0.1929 each on or before 31 March 2023, were exercised into shares subsequent to 30 September 2021. The unlisted options were previously issued under an employee incentive scheme.

(3) 10,344,828 fully paid ordinary shares at an issue price of $1.45 per share were issued subsequent to 30 June 2021, pursuant to a share placement to professional and sophisticated investors, announced to ASX on 4 October 2021.

About Archer

Archer is a technology company that operates within the semiconductor industry. The Company is developing and commercialising advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics.

The Board of Archer authorised this announcement to be given to ASX.

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