Specifications and Statement of Work for X-ray Source Installation:

X-ray emission requirements:

1. X-ray emission shall be continuous. Pulsed x-rays are not acceptable.
2. Source shall be capable of 320 keV energy x-rays or higher, but also tunable to produce x-rays of lower energy as needed.
3. Minimum x-ray tube current of 30 mA. A high flux of high energy x-rays is an absolute requirement.
4. Spot size shall be no more than 1 mm in diameter. An adjustable focus is desirable.
5. A Gaussian beam profile is required to focus maximum intensity on the sample.
6. Dose rate shall be 1 mGy/s or higher at 1m from the sample at 320keV x-ray emission with 1mA of x-ray tube current. 80 cm is the minimum distance possible to the sample.

Integration with vacuum system requirements:

1. A radiation protection by lead shielding housing shall be a part of the system to be assembled after the delivery.
2. Integration into vacuum chamber is to be required at the time of installation for the radiation protection lead housing box. Severe loss of intensity occurs if the x-ray beam has to pass through the stainless steel chamber wall.
3. Single phase power is required. Laboratory does not have enough circuits for three-phase power
4. Custom designed x-ray system, complete with lead shielding, within an approximately 3m x 2m footprint, including the experimental setup. Necessary cooling systems do not need to be included in this footprint, as these can be positioned elsewhere.
5. Vacuum system is about 5ft. above the ground, mounted on an electronics rack. All power supplies and equipment in the rack shall be accessible after the x-ray system is constructed.
6. The target sample inside the vacuum chamber is approximately 1ft. inward from the edge of the rack. The x-ray source shall be aligned to illuminate the target with x-rays.