

Prion treatment by MC water and other chemicals.

Koichi Furusaki¹, Takashi Onodera²

¹Santa Mineral Co.,Ltd. (Mineral Activation Technical Research Center) ²University of Tokyo

Calcium
Carbon

• The main raw materials are rocks containing fossils, vegetation, and soil. MC (micro cluster) Water is manufactured by dissolving useful minerals, mainly calcium and carbon, from the raw materials into water. (Minerals that have gone through biotic processes[[please confirm]] are thought to differ from regular minerals in that they easily form structures when dissolved in water again, and we employ this mechanism here.)

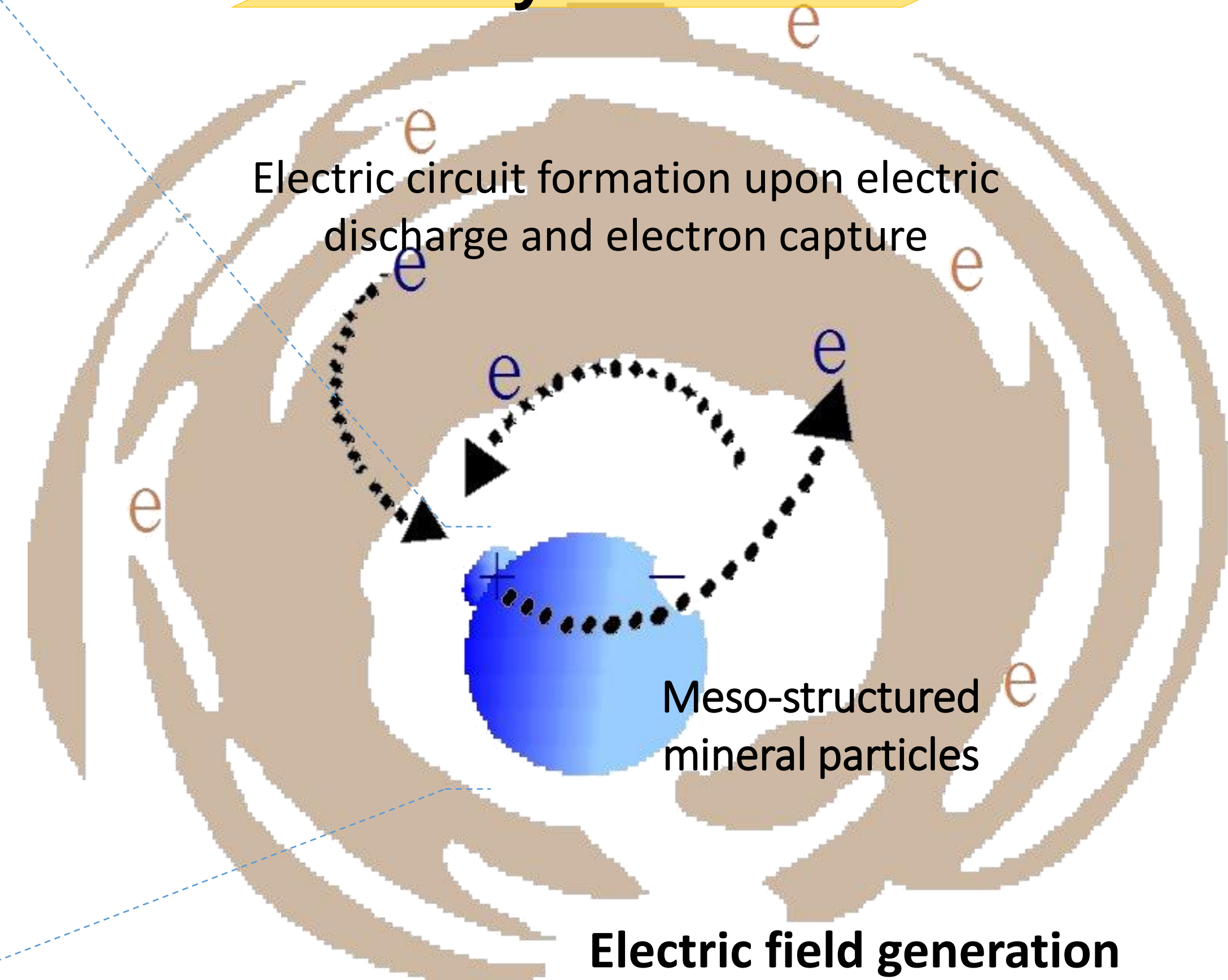
Thz meso-structured particles

• The minerals, now as crystals in water, are sized into 50-500 nm and linked to each other using our custom technology. During the aggregation process, mineral-specific absorption wavelengths in the THz range were combined so that all the atoms are aligned as a surface layer and form meso-structured particles in the water.

Resonance with free electron energy

• The meso-structured particles are polarized by electric stimulation to impart electrogenic properties using electron supplementation. In other words, a circuit is formed when the THz meso-structured particles incorporate free electrons from outside and circulate them inside, generating an electric field at the negative end.

Summary of MC water



Maintaining high alkalinity (pH12) and safety

The electric field generated in MC Water is characterized by its ability to continuously generate high-voltage pulses. The surrounding water molecules in contact with THz meso-structured particles receive an electrical discharge and disassociate into H⁺ and OH⁻ ions by electrolysis. However, because of the negative potential and the hydrogen-absorption properties of THz meso-structured particles, H⁺ ions are converted back to hydrogen atoms (H) by the electrons from the THz meso-structured particles, and hydrogen atoms so generated are accumulated and stored inside the particles. This causes a relative reduction in H⁺ ions and imparts a high alkalinity to the MC water (pH 12 or more) despite the low calcium and carbon content. However, this strongly alkaline water is not at all corrosive or irritating because it contains no designated poisons, such as caustic soda (NaOH) or caustic potash (KOH). Furthermore, when this highly alkaline ionized water is brought into contact with the surface of humans or animals, the meso-structure changes due to reactions with pathogens and other organic materials, suppressing its electrogenic properties. As a result, MC Water becomes mineral water with a pH of 7, and is extremely safe for tissue.

In contrast to other pathogens like viruses and bacteria, fixation using aldehyde slightly decreases the prion titer but this is insufficient. Therefore, for treatment of tissue sections of prion infected animals, formic acid is recommended. Recently, the effectiveness of other treatments has been reported. Nonetheless, animal bioassays must be performed in order to fully demonstrate the effectiveness of these treatments on prion inactivation, which takes a considerable length of time (about 1 year or more). This makes it difficult to examine other forms of treatment given the cost and time-consuming nature of the tests. Currently, the following procedures for prion inactivation are recommended by the Japanese government and Society for Healthcare Epidemiology of America . (i) washing with appropriate detergents + SDS treatment (3%, 3-5 min), (ii) treatment with alkaline detergents (80 - 93° C, 3-10 min) + autoclaving (134° C, 8-10 min), (iii) washing with appropriate detergents + autoclaving (134° C, 18 min), and (iv) washing with alkaline detergents (at a concentration and temperature according to instructions) + vaporized hydrogen peroxide gas plasma sterilization. Most importantly, a dried prion-infected apparatus is difficult to sterilize, therefore prompt washing is essential. This procedure should be followed by autoclaving at 134° C and vaporized hydrogen peroxide gas plasma sterilization in order to attain an assurance level of prion inactivation of less than 10⁻⁶. Recently we have developed new way of treatment using functional water (Micro-cluster water). We can electrolyze water using only minerals (CaHCO₃) and create pH 12.5 alkaline water, which kills many kinds of pathogens including multi-drug resistant bacteria and prions. In the future we may apply it to humans, animals or food directly.

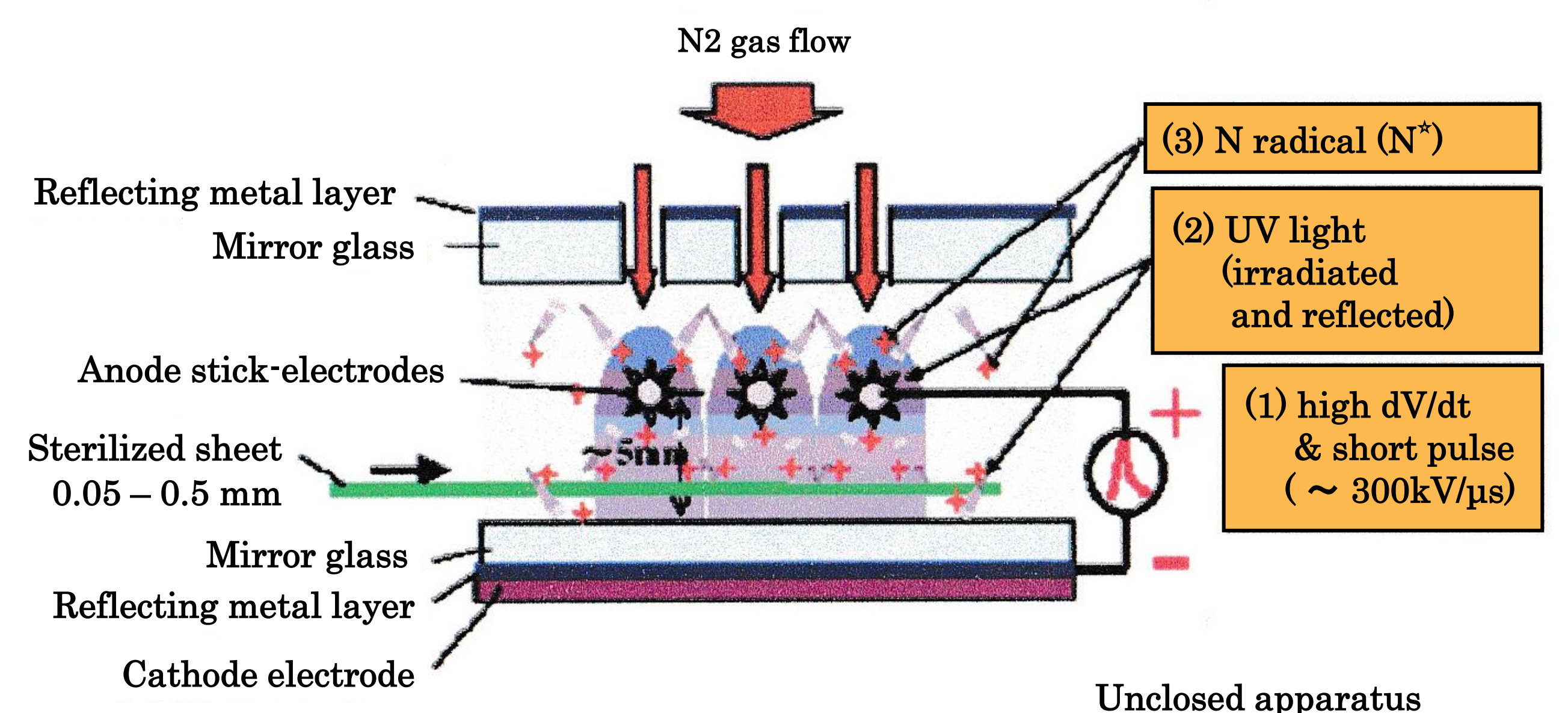


Figure 1. Constitution of N₂ gas plasma sterilization apparatus. Atmosphere in the apparatus with an N₂ gas flow. Under the conditions, high dV/dt and short pulses were applied, resulting in the generation of gas plasma. The possible sterilization mechanisms are as follows. (1) high dV/dt and short pulses, (2) UV exposure, (3) N radical. Cited from Fig.1(a) in Shintani *et al.*, (40) with permission from Society for Antibacterial and Antifungal Agents, Japan. UV,ultraviolet.

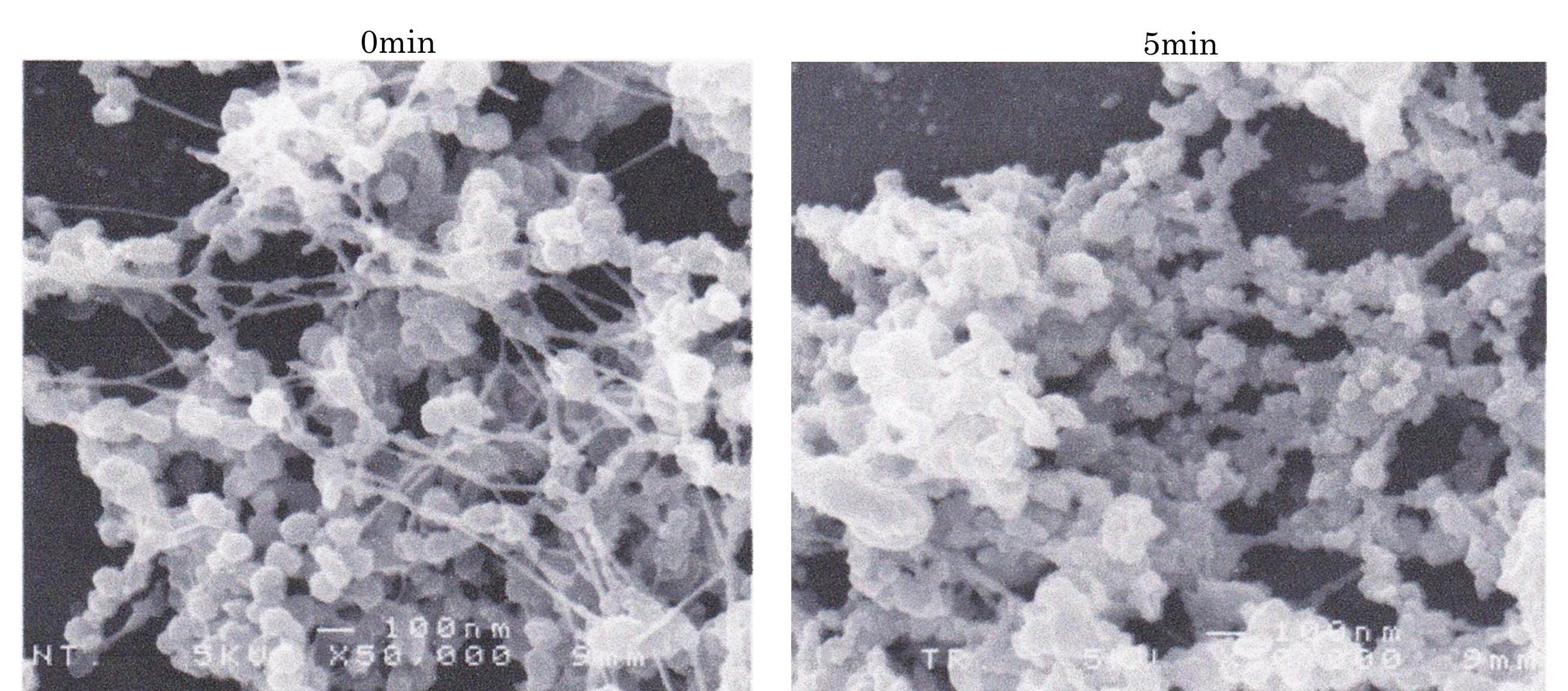


Figure2:Change in morphology of influenza virus after treatment with N₂ gas plasma. Influenza A virus (A/PR/8/34) in allantoic fluid was air-dried on cover glass and treated with N₂ gas plasma (1.5kpps for 5min) using BLP-TES No.1. An identical sample was also prepared that was not treated with N₂ gas plasma. The morphologies of influenza virus were observed at 5kV with a magnification of x50,000 by SEM (JSM-6320F,JEOL Ltd.).

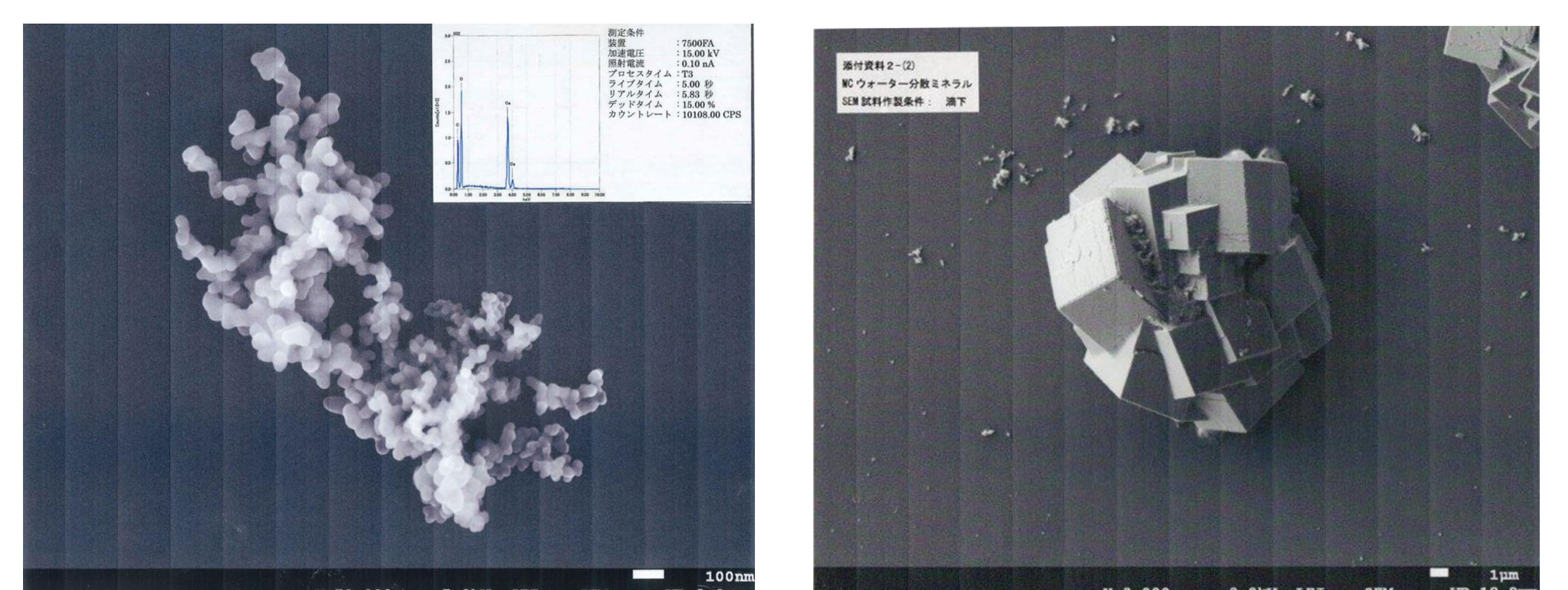


Figure3:Both are calcium. However, the calcium in the meso-structure (left figure), which is the intermediate stage in the transition from the micro to macro state, has a large surface area and hydrogen-absorption and electric-discharge (electrogenic) properties. When this calcium is in the macro state (right figure), it forms a crystal with a small surface area and loses the properties of the meso-structure.

Sakudo, A., Ano, Y., Onodera, T., Nitta, K., Shintani, H., Ikuta, K., and Tanaka, Y.: *Fundamentals of prions and their inactivation (Review)*. *Int. J. Mol. Med.* 27:483-489, 2011.