



VIS Project 80671 - Algorithm for automated detection and estimation of nanoparticles using Single particle Inductively coupled plasma mass spectrometry

This document summarizes the invention submitted by Are Sæle Bruvold in a Disclosure of Invention (DOFI) in September 2021 and the evaluation conducted by Vestlandets Innovasjonsselskap AS - VIS.

In his research, Are used Single Particle Inductively Coupled Plasma Mass Spectrometry (Sp-ICP-MS) to detect nanoparticles. To achieve this, he intended to utilize both an instrument and a software package from one of the major suppliers. Unfortunately, the software from the supplier yielded unsatisfactory results, as issues of repeatability and false detections were reported when attempting to use it. To advance the research, Are developed an alternative algorithm to overcome these challenges. The algorithm is based on known elements and has proven effective in resolving the identified issues. Multiple datasets have been tested, confirming that the algorithm is comparable to commercial methods for simple datasets. Importantly, it demonstrates superior performance, including reduced false positives and false negatives, as well as improved repeatability, particularly for data with higher background noise or varying background levels. Additionally, the algorithm provides additional output parameters and enables result validation through visual examination of particle events in the spectra.

The invention originated from the inventor's work at IMR, which necessitated the submission of a DOFI to VIS for evaluation. VIS has assessed the commercial potential of the invention, taking into account the Non-Disclosure Agreement (NDA) signed with the supplier for software evaluation, as well as considerations of patentability, including freedom to operate and prior art. However, the evaluation was confined to a specific known patent. In summary, the NDA was found to be a potential limitation, and it was recommended to explore the possibility of commercializing the idea with the same supplier, if feasible. With regard to patentability, the results indicate that the invention described in the DOFI does not infringe upon the specific patent considered during the evaluation. Furthermore, it is deemed patentable when considering only the specific patent evaluated as prior art. However, during the evaluation process, the researcher came across a recently published article that discloses a method very similar to what has been developed at IMR. The differences between the algorithms do not seem to provide any significant advantages for the IMR method.

Based on the above findings, particularly the recently published article, VIS concluded that the possibility of commercializing the results outlined in the DOFI is unfortunately very slim. Therefore, the recommendation from VIS was to publish the results of the study without any restrictions on disclosing the detection algorithm. IMR has followed this recommendation.

Best regards,

VIS – Vestlandets Innovasjonsselskap AS

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