

PRESS RELEASE

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INM expertise explains slightly blue discoloration of drinking water in the Heidelberg area

The Physical Analytics Group at the INM succeeded in explaining why drinking water in the community of Dossenheim (Rhein-Neckar Kreis) just outside Heidelberg had a slightly blue color some time ago: the reason was a distribution of nanoscopic, completely harmless lime particles. They are not visible to the naked eye and difficult to find using chemical analysis methods. Such nanoparticles of lime are a natural component of many drinking water sources. A slight blue discoloration becomes visible only at higher concentrations.

The health department of the Rhein-Neckar-Kreis, which is also responsible for the city of Heidelberg, was able to confirm the safety of the drinking water with chemical analysis methods on the day of the incident in February. But the cause of the slightly bluish color of the drinking water could not be identified. Therefore, the health department turned to the Leibniz Institute in Saarbrücken for an advanced physical analysis of various water samples.

"First, we examined the samples with a special electron microscope. For what is known as cryo-transmission electron microscopy, we shock-froze thin films of the water samples. The original structure of possible constituents in the water is retained," explains Marcus Koch, Head of Physical Analytics at the INM. Even the tiniest structures can be represented with this measuring method. It provided evidence of nanometer-sized, undissolved carbonate compounds or "lime".

In addition, the water samples were examined using what is known as dynamic light scattering: Just as small molecules in air scatter light and make the sky appear blue or reddish, the nanometer-sized carbonate particles in the water also scatter the light. "Although the water appeared clear to the naked eye, the light scattering by the carbonate particles was physically measurable," explains Isabella Tavernaro, an expert in light scattering methods at the INM. This measurement method provides information about the size and size distribution of the particles. "This enabled us to confirm that the carbonate particles are actually nanometer-sized structural units. Light scattering also explained the slightly blue coloration of the water," says Tavernaro, summarizing the measurement results.

"We are pleased that the high level of expertise of our scientists and the versatile methodology of INM have contributed to solving the mystery of the coloration of water in Heidelberg," said Eduard Arzt, Scientific Director of the

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INM. The support of the health department in the Rhein-Neckar-Kreis is further proof of the INM's valued analytical expertise, which extends far beyond the campus in Saarbrücken.

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