Guest editorial

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This is the second part of the special issue of *Foundations of Chemistry* that brings together selected papers presented at 2016 symposium of the International Society for the Philosophy of Chemistry, which was held August 1–4 in Boca Raton, Florida (USA).

In this second part of the special issue, we offer contributions by Mariana Córdoba, Alfio Zambon, Hirofumi Ochiai, Vanessa Seifert, and Yona Siderer.

The contribution by Mariana Córdoba and Alfio Zambon is titled “How to handle nanomaterials? The re-entry of individuals into the philosophy of chemistry”. The paper begins by arguing that there has not been enough discussion in the philosophy of chemistry about the treatment of nanomaterials, that is, materials whose structure is manifest between 1 and 100 nm and for which geometrical structural relations are of central importance to behavior. Córdoba and Zambon wish to address some of the ontological questions that arise when dealing with materials at the quantum scale. In this paper, they discuss how the category of individual is re-introduced when dealing with nanomaterials by explaining that nanomaterials must be considered as individuals because they are complete and indivisible unities.

In his essay “Does a Molecule Have Structure?”, Hirofumi Ochiai addresses one of the most fundamental issues in the philosophy of chemistry, the assumption that molecules have shape and structure in much the same way that objects in the world have shape and structure. Ochiai begins with the argument that, since the configuration space used in quantum theory is an abstract Hilbert space, shape and structure do not appear in quantum treatment of molecules starting from first principles. Following upon the Kantian thesis that we can only cognize experienced phenomena but not objects as they exist in themselves, Ochiai argues that shape and structure are not attributes of the molecules themselves but contributions of the subject. Thus, all that is accessible to us is the modal structure of the models. However, even the most sophisticated calculations are never able to determine which, among the various possible models of structure, is the correct one.

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The essay by Vanessa Seifert, titled “An Alternative Approach to Unifying Chemistry with Quantum Mechanics”, applies Harold Kincaid’s economic model of unity-without-reduction to develop an alternative position in the debate between reductionists and emergentists in the philosophy of chemistry. Seifert begins by discussing these two opposing views regarding the relation of chemistry to quantum mechanics and argues that both extremes should be rejected in favor of a middle ground that requires the ontological supervenience of chemical entities without commitment to either reduction or emergence. By transferring Kincaid’s ‘union-without reducibility’ model from the context of economics to that of chemistry, Seifert argues that chemistry and quantum mechanics form an ‘integrated interleveled theory’ that describes and predicts molecular structure through the evidential, explanatory, and descriptive contributions of both sciences.

The final contribution for this second part of the special issue is by Yona Siderer and is titled “Udagawa Youan’s (1798–1846) translation of light and heat reactions in his book *Kouso Seimika*”. In this essay, Siderer discusses the Japanese translations of Western chemistry books that began in the early 1800’s, focusing on Udagawa Youan’s translation from a Dutch edition of Antoine Lavoisier’s *Traité Élémentaire de Chimie*. Youan’s translation, titled *Kouso Seimika (Chemistry of the Element of Light)* focuses on a paragraph from *Traité Élémentaire de Chimie* that discusses light and heat reactions with various substances as Lavoisier understood them. Siderer closely examines Youan’s translation, comparing it to the French original and to English and Dutch translations, to reach important conclusions about the creative ways by which Youan solved the many challenges he encountered in producing his Japanese translation. Siderer ends her close study of this translation by emphasizing the pioneering role played by Youan in introducing the natural sciences to Japan and in coining new terms for botany and chemistry, many of which are still in use today.