**UPDATED DISCUSSION QUESTIONS**

1. Explain how the information in Table 2 results in the formula LaGaBi2 rather than LaGaBi4. How many formula units are contained within the unit cell? You may use VESTA (a free downloadable software to create 3D structures) to visualize the crystal structure using the information from tables 1 and 2. (<https://jp-minerals.org/vesta/en/>)

2. The most important results of the band structure calculations are presented in Figure 7.

(a) Explain why this figure only considers the [Ga6Bi12]18– substructure. What is the justification for omitting lanthanum from this substructure?

(b) Summarize the conclusions about Ga–Ga bonding in this material including the evidence from Figure 7 and bond distances.

(c) Describe the conclusions about Ga–Bi bonding in this material. Be sure to discuss each type of bismuth, explaining how Figure 7 supports the argument.

(d) Explain using any relevant bond distances or figures from the paper why the Bi–Bi bond is strengthened when the [Bi3] ribbons are involved in the entire covalent framework.

3. Explain the basic idea behind X-ray Photoelectron Spectroscopy (XPS). How does it work? Why do you think the authors conducted XPS studies on this material? What were they trying to learn? What conclusions did they draw from the XPS data? Cite your reference.

4. Based on the temperature-dependent resistivity plot (figure 8), how would you classify the electronic nature of LaGaBi2? (insulating, semiconducting, or metallic). How does this relate to the density of states in Fig. 7a.