

CONCLUSION
of the Dissertation Council on Chemistry and Engineering
at Al-Farabi Kazakh National University
on the dissertation work of Mr. Anas Houbi on the topic "Creating and studying
new composite materials for microwave absorption in the range of 8.8-12 GHz",
submitted for the degree of Doctor of Philosophy (PhD) under the educational
program "8D07104 - Chemical Technology of Inorganic Substances"

Based on the results of the defense and secret ballot on February 22, 2023, the dissertation council decided to send for revision the dissertation of Mr. Anas Houbi on the topic "Creating and studying new composite materials for microwave absorption in the range of 8.8-12 GHz", submitted for the degree of Doctor of Philosophy (PhD) under the educational program "8D07104 - Chemical Technology of Inorganic Substances". When revising the dissertation, the following comments should be addressed:

1) Statistics should be properly described in the dissertation. It is unclear how many times experiments were repeated (or how many experimental samples were prepared for each value of an independent variable), how exactly mean values and standard deviations were determined. Values of standard deviations should be provided.

2) There are too many significant figures in many reported values. They should be rounded according to their uncertainties or standard deviations.

3) Dissertation is not properly formatted. Spaces are missing between tables and text, figures and text. Formatting should be conducted using a single style.

4) Description of the practical significance of the work in introduction and abstract of the thesis should be improved. Potential application of the obtained results should be presented.

5) References (citations) to the borrowed figures are not provided.

6) Quality of English should be improved in the dissertation.

7) The object(s) of the research must be concrete, such as PANI/Ni³⁺_{0.25}Ni²⁺_{0.375}Zn²⁺_{0.25}Fe₂O₄ and PANI/BaNiZnFe₁₆O₂₇ composites.

8) Details of the particle size analysis conducted using SEM images and ImageJ are not provided in the dissertation.

9) Novelty is not shown clearly. There are many previous studies on EMA properties of these materials and their combination.

10) It is unclear how dielectric and magnetic fillers enhance EM wave absorption performance. Please explain it with polarization, dipole movement, conductance loss, and loss tangent.

11) The research results are dispersed throughout the dissertation in a very peculiar way: X-ray diffraction analyses, surface morphology, Fourier IR studies and microwave absorbing properties of all materials are divided into headings. In order to grasp the relationship between X-ray diffraction analysis of IR studies with the microwave absorbing properties of nanocomposite materials, it is necessary to return to the beginning of the dissertation.

