

Investigation of optical properties of MnPS_3 and NiPS_3 van der Waals magnetic semiconductors

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The 1930s are considered the beginning of antiferromagnetism. Interest in this condition continues to grow, and ongoing research has shown many new properties of antiferromagnetic materials. The terms associated with the research of Néel, Landau, and Schubnikov will be talked about in the scientific world for a long time to come.

In recent years, scientists have become interested in antiferromagnets in the context of semiconductors. Iron, manganese, cobalt, nickel, or chromium - these materials are well known, but relatively recent interest in them in van der Waals structures has increased. They have begun to be studied optically, and the combination of optical and magnetic properties has attracted attention, especially after the discovery of correlations between the two.

The purpose of this work is to study magnetic materials of the MPS_3 ($M = \text{Mn}, \text{Ni}$) family in general by optical methods. The basic tests performed will allow to verify the parameters of the samples, compare them and draw conclusions about the correlation of optical and magnetic properties.

Thanks to the measurements carried out by absorption and photoreflectance spectroscopy methods, it was possible to determine parameters such as the absorption edge of the materials, as well as the energy value of d-d transitions, characteristic of metal phosphorus trichalcogenides materials. The determined quantities are consistent with the literature, and the intricacy of the subject allows for further research with these materials.

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