Structural Chemistry of Metal Inorganic 3D MT Frameworks. 
Templated Nanoclusters—Precursors Ga₂(PO₄)₂F₂ and Ga₂(PO₄)₂(HF)₂ and Self-Assembly of Crystalline 
Gallophosphate Structures (NH₄)₂[Ga₂(PO₄)₂F₂](KTP-Type) 
and (NH₄)₂[Ga₂(PO₄)₂(HF)₂](p-KTP-Type) 
icates of M-octahedra and T-tetrahedra was discussed in [11–14]. In terms of topological types of clusters—precursors, participating in the self-assembly of crystalline structures, 17 types of framework structures A, Zr-silicates (A = Li–Cs) in [12–14] were relegated to three homological series based on four-polyhedral cyclic M₂T₂ clusters, six-polyhedral cyclic M₂T₄ clusters, and four-polyhedral clusters of the MTMT and MTTM chain type. The work [13] for the first time analyzed templating the cyclic clusters M₂T₄ with atoms of alkaline (A) and alkaline earth (B) metals, and the interrelation between the chemical composition of nanoclusters—precursors and the composition of microstructures of A/B, Zr-silicates (A = Na, K; B = Ca, Sr) was established.

The family of metal inorganic microporous 3D MT-frameworks, in addition to the aforementioned zirconium silicates, also includes numerous crystalline structures of silicates and phosphates of polyvalent metals M = M(3+), M(4+), M(5+), and M(6+), which are obtained using alkaline and rare earth metals, as well as inorganic and organic molecules, as templates. Table 1 summarizes the chemical composition of the MT-structures of gallophosphates [15]. It should be noted that the majority of them were obtained in the last 15 years. In addition, at present more than 100 MT-structures of aluminophosphates were investigated [15]. In total, 2020 metallic phosphates, including all possible types of molecular, chain, layer, and framework MT-structures, have been studied [15]. It is possible to assume that the framework 3D MT-structures of aluminophosphates and galkophosphates are formed both with the participation of clusters—precursors, established previously for zirconium silicates, and new topological types of clusters—precursors, the structural models of which are discussed in this work.

This work performs the geometrical topological simulation of topologically different M₂T₂ suprapolyhedral clusters of two octahedra and two tetrahedral, with the hierarchical structures presented in the form of two-colorable graphs.

A search for local M₂T₂ fragments was performed in the created database of crystalline MT-structures, composed of 13455 compounds included in ICSD [15], by means of the ToposPro program package[16], which enables multipurpose investigation into crystalline structures in the automatic mode, using the pre-