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# Structural Studies of fluorophosphate Laser Glasses by Solid State NMR

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## Abstract

In this presentation, we will report the structure study of BaF<sub>2</sub>-YF<sub>3</sub>-Na<sub>2</sub>O-P<sub>2</sub>O<sub>5</sub>-NaF glass system by solid state NMR. Based on <sup>23</sup>Na, <sup>31</sup>P, and <sup>19</sup>F high resolution solid state NMR as well as on <sup>31</sup>P/<sup>19</sup>F and <sup>23</sup>Na/<sup>19</sup>F double resonance results, we develop a quantitative structural description on the atomic scale. <sup>19</sup>F NMR results indicate a systematic dependence of the fluoride speciation on the content of YF<sub>3</sub>. F<sup>-</sup> ions were transferred from P<sup>5+</sup> ions to Ba<sup>2+</sup> and Y<sup>3+</sup> ions with the increasing of YF<sub>3</sub>. Both F<sup>-</sup> and Y<sup>3+</sup> ions were homogeneously distributed in the glasses. No nanophase segregation was observed. P<sup>5+</sup> ions mainly exist as [PO<sub>4</sub>]<sup>3-</sup> groups with minute [PO<sub>3</sub>F]<sup>2-</sup> groups.

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