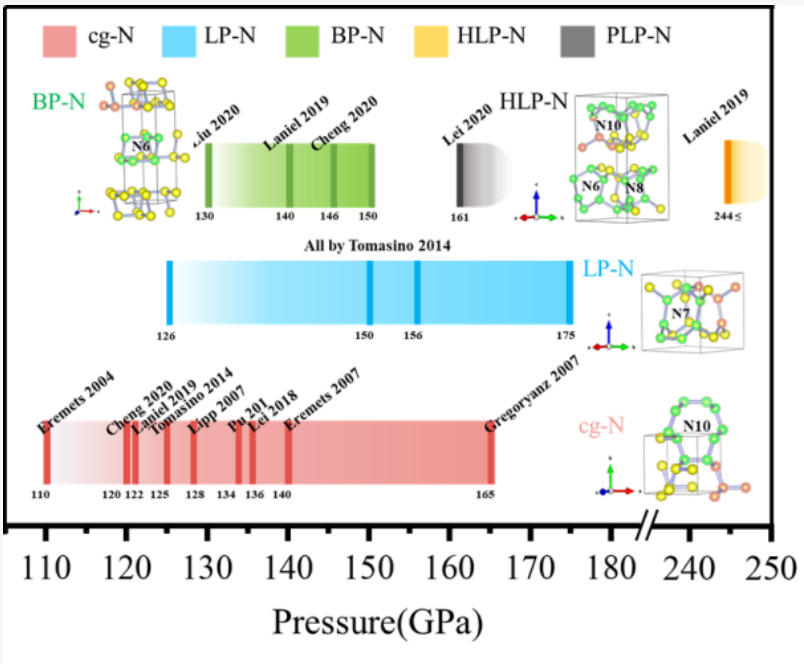
Scientists used large scientific facilities to test the synthesis and characterization of polymeric nitrogen

CHINA, December 13, 2023 /EINPresswire.com/ -- Researchers summarized the outstanding achievements and research status in the research field of polymeric nitrogen, summarized the important challenges faced in the synthesis and characterization of polymeric nitrogen, and put forward the prospect of the research of polymeric nitrogen.



THE HISTORY AND CHARACTERISTICS OF POLYMERIC NITROGEN SYNTHESIZED HITHERTO.

Polymeric nitrogen (PN), formed under high temperature and pressure conditions, is considered an ideal high energy density material (HEDM). Its application prospects extend beyond the field of energetic materials, showing significant relevance in the field of fundamental physics. The 20th century witnessed the complex behavior of nitrogen's high-pressure phase. The advent of large scientific installations and advanced spectroscopy techniques has also furthered our understanding in this topic.

In a recent review published in the KeAi journal Energetic Materials Frontiers, a group of researchers from China outlined the studies of the synthesis, structural properties and lattice dynamics of polymeric nitrogen based on a large scientific facilities and spectroscopic perspective under extreme conditions.

Their review of the studies conducted through scientific facilities and spectroscopic methods under extreme conditions, shed light on various synthesized forms of polymeric nitrogen. Notable among these are cubic gauche nitrogen (cg-N), layered polymeric nitrogen (LP-N), hexagonal layered polymeric nitrogen (HLP-N), post-layered-polymeric nitrogen (PLP-N), and black phosphorous structure nitrogen (BP-N). The authors also discussed the synthesis methods,

characterization techniques, current challenges and structural similarities, presenting Raman criteria for each.

“The study of PN has achieved some gratifying results, but there are still many problems to be solved,” noted the authors. "First, the progress in the technology of thermodynamic synthesis conditions is necessary to identify and probe the evolution and phase diagram of PNs. Second, the comprehensive understanding of synthesized products needs advances in various diagnostic methods."

"Moreover, the bandgap of PN at high pressure has not been investigated experimentally until now, which is a promising direction for studying the high-pressure electronic band structure of PN,” they added.

DOI
10.1016/j.enmf.2023.09.005

Original Source URL
https://doi.org/10.1016/j.enmf.2023.09.005

Funding information
This research was supported by the National Natural Science Foundation of China (Grant No. U2030107, 11774247) and the Fundamental Research Funds for the Central Universities (Grant No. 2020SCUNL107).

Lucy Wang
BioDesign Research
email us here