What is claimed is:

CLAIMS

1. A piezoelectric material comprising:

AlN doped with cations of one or more elements selected from the group consisting of:

a) one of Sb, or Nb;
b) Cr in combination with one or more of B, Sc, Y, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, or Yb;
c) one of Nb and Ta in combination with one of Li, Ca, Ni, or Co;
d) one or more of Co, Sb, Ta, Nb, Si, or Ge in combination with one or more of Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, or Yb;

the cations at least partially substituting for Al in a crystal structure of the piezoelectric material.

2. A piezoelectric material having the formula $Al_{1-5/3x}Ta^{5+}{}_x\square_{2/3x}N$, $\square$ representing a vacancy in an Al site in the crystal structure of the piezoelectric material.

3. A piezoelectric material comprising AlN doped with cations of Cr in combination with B and having the formula $Al_{1-2x}B_xCr_xN$ $0<x<0.15$, the cations at least partially substituting for Al in a crystal structure of the piezoelectric material.

4. A piezoelectric material comprising AlN doped with cations of Cr in combination with one or more of Sc, Y, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, or Yb and having the formula $Al_{1-x-y}Cr^{3+}{}_xM^{III}{}_yN$, where $M^{III}= Sc^{3+}$, Y^{3+}, $Sm^{3+}...Yb^{3+}$, and where $Sm^{3+}...Yb^{3+}$ = any one or more of the Lanthanides with atomic numbers from 62-70, the cations at least partially substituting for Al in a crystal structure of the piezoelectric material.

5. The piezoelectric material of claim 1 having a Wurtzite crystal structure.

6. An acoustic wave resonator including the piezoelectric material of claim 1.

7. The acoustic wave resonator of claim 6 configured as a solidly mounted resonator.

8. The acoustic wave resonator of claim 6 configured as a film bulk acoustic resonator.

9. A filter including the acoustic wave resonator of claim 6.

10. The filter of claim 9 having a passband in the radio frequency band.

11. An electronic device module including the filter of claim 9.

12. An electronic device including the electronic device module of claim 11.

13. The electronic device of claim 12 wherein the electronic device module is a radio frequency electronic device module.

14. An acoustic wave resonator including the piezoelectric material of claim 3.

15. A filter including the acoustic wave resonator of claim 14.

16. An electronic device module including the filter of claim 15.

17. An electronic device including the electronic device module of claim 16.

18. An acoustic wave resonator including the piezoelectric material of claim 4.

19. A filter including the acoustic wave resonator of claim 18.

20. An electronic device module including the filter of claim 19.