Claims

1. A workpiece having a coating, said coating comprising at least one $Ti_xSi_{1-x}N$ layer, characterized in that $x \leq 0.85$ and the $Ti_xSi_{1-x}N$ layer contains nanocrystals and the nanocrystals present have an average grain size of not more than 15 nm, wherein x is the concentration of Ti expressed in at% when only metallic elements are taken into consideration.

2. The workpiece according to claim 1, characterized in that an intermediate layer containing TiAlN is provided between the $Ti_xSi_{1-x}N$ layer and the substrate body of the workpiece.

3. The workpiece according to claim 2, characterized in that a transition layer containing both TiAlN and $Ti_xSi_{1-x}N$ is provided between the intermediate layer and the $Ti_xSi_{1-x}N$ layer.

4. The workpiece according to claim 3, characterized in that the transition layer is a graded layer having a silicon content that increases as the distance from the substrate surface increases.

5. The workpiece according to claim 1, characterized in that an intermediate layer containing $Cr_yAl_{1-y}N$ is provided between the $Ti_xSi_{1-x}N$ layer and the substrate body of the workpiece, wherein y indicates the Cr concentration expressed in at%, when only the metallic elements are taken into consideration.

6. The workpiece according to claim 5, characterized in that a transition layer containing both $Cr_yAl_{1-y}N$ and $Ti_xSi_{1-x}N$ is provided between the intermediate layer and the $Ti_xSi_{1-x}N$ layer.

7. The workpiece according to claim 6, characterized in that the transition layer is a graded layer having a silicon content that increases as the distance from the substrate surface increases.

8. A method for coating a workpiece according to any one of the preceding claims, characterized in that a sputtering process is used to produce the $Ti_xSi_{1-x}N$ layer, in which at least one Ti_xSi_{1-x} target is used as a sputtering target, wherein $x \leq 0.85$ in at% and wherein current densities of at least 0.2 A/cm^2, preferably more than 0.2 A/cm^2, arise on the target surface of the sputtering target.

9. A method for coating a workpiece according to any one of the preceding claims 3, 4, 6, or 7, characterized in that the transition layer is produced by means of co-sputtering.

Claims

1. A method for coating a workpiece with a coating comprising at least one $Ti_xSi_{1-x}N$ layer, wherein $x \leq 0.85$ and wherein the $Ti_xSi_{1-x}N$ layer contains nanocrystals and the nanocrystals present have an average grain size of not more than 15 nm, wherein x is the concentration of Ti expressed in at% when only metallic elements are taken into consideration, characterized in that a sputtering process is used to produce the $Ti_xSi_{1-x}N$ layer, in which at least one Ti_xSi_{1-x} target is used as a sputtering target, wherein $x \leq 0.85$ in at% and wherein current densities of at least 0.2 A/cm^2, preferably more than 0.2 A/cm^2, arise on the target surface of the sputtering target.

2. The method according to claim 1, characterized in that the method is used for coating a workpiece, wherein an intermediate layer containing TiAlN is provided between the $Ti_xSi_{1-x}N$ layer and the substrate body of the workpiece.

3. The method according to claim 1, characterized in that the method is used for coating a workpiece, wherein a transition layer containing both TiAlN and $Ti_xSi_{1-x}N$ is provided between the intermediate layer and the $Ti_xSi_{1-x}N$ layer.

4. The method according to claim 1, characterized in that the method is used for coating a workpiece, wherein the transition layer is a graded layer having a silicon content that increases as the distance from the substrate surface increases.

5. The method according to claim 1, characterized in that the method is used for coating a workpiece, wherein an intermediate layer containing $Cr_yAl_{1-y}N$ is provided between the $Ti_xSi_{1-x}N$ layer and the substrate body of the

workpiece, wherein y indicates the Cr concentration expressed in at%, when only the metallic elements are taken into consideration.

6. The method according to claim 5, characterized in that the method is used for coating a workpiece, wherein a transition layer containing both $Cr_yAl_{1-y}N$ and $Ti_xSi_{1-x}N$ is provided between the intermediate layer and the $Ti_xSi_{1-x}N$ layer.

7. The method according to claim 6, characterized in that the method is used for coating a workpiece, wherein that the transition layer is a graded layer having a silicon content that increases as the distance from the substrate surface increases.

8. The method for coating a workpiece according to any one of the preceding claims 3, 4, 6, or 7, characterized in that the transition layer is produced by means of co-sputtering.