Non Patent Document 7: Watanabe, H.; Komura, T.; Matsumoto, R.; Ito, K.; Nakayama, H.; Nokami, T.; Itoh, T. Design of Ionic Liquids as Liquid Desiccant for an Air Conditioning System, Green Energy & Environment, 4 (2019), 139-145.

Non Patent Document 8: Maekawa, S.; Matsumoto, R.; Ito, K.; Nokami, T.; Li, J-X.; Nakayama, H.; Itoh, T.* Design of Quaternary Ammonium Type-Ionic Liquids as Desiccants for an Air-Conditioning System, Green Chemical Engineering, 1 (2020), 109-116.

Non Patent Document 9: Dicationic Type Quaternary Ammonium Salts as Candidates of Desiccants for an Air-Conditioning System, Itoh, T.; Hiramatsu, M.; Kamada, K.; Nokami, T.; Nakayama, H.; Yagi, K.; Yan, F.; Kim, H-J. ACS Sustainable Chem. Eng., 9 (2021), 14502-14514.

SUMMARY

PROBLEM TO BE SOLVED

[0005] The lithium chloride aqueous solution and the calcium chloride aqueous solution disclosed in Non Patent Documents 1 to 2 have an advantage of being able to obtain low-humidity air in a stable state. However, in general, aqueous solutions of alkali metal salts and alkaline earth metal salts of these halide ions are corrosive to metals. Therefore, when these substances are applied to a moisture control material, there exists a problem that a highly corrosion-resistant material such as titanium is required for use in a part in contact with the moisture control material in apparatuses such as air conditioners and absorption refrigerators.

Although an ionic liquid composed of cholinium cations and lactic anions having high moisture absorption property is

moisture control materials. However, it has been found that the aqueous solution of dicationic ammonium=dimethyl phosphate salt has a relatively high viscosity (Non Patent Document 9).

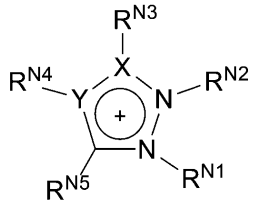
The present disclosure has been made in the light of the circumstances, and the object thereof is to provide a moisture control material that exhibits good moisture absorption properties (moisture absorption capacity and water vapor exchange capacity) and low viscosity, having low corrosiveness to metals.

MEANS FOR SOLVING THE PROBLEM

[0006] Based on the above problems, the present inventors have conducted studies and found that the above problems can be solved by using a moisture control material containing a salt composed of triazolium cations and phosphate ester anions, having a specific structure.

Specifically, the problem has been solved by the following means.

<1> In an aspect, there is provided a moisture control material comprising a salt composed of a triazolium cation represented by the following formula (N1) and a phosphate ester anion:



------- (N1)

wherein in formula (N1), X and Y represent a nitrogen atom or a methine group, with proviso that any one of X and Y is a nitrogen atom, and another one is a methine group; R^{N1}, R^{N2}, R^{N3}, R^{N4} and R^{N5} are each independently absent, a hydrogen atom, an

<9> The moisture control material according to any one of items <1> to <8>, having an equilibrium water vapor pressure at 25°C of 100 hPa or less, and an equilibrium water vapor pressure at 50°C of 150 hPa or more.

<10> The moisture control material according to any one of items <1> to <9>, having a value as difference between the equilibrium water vapor pressure at 25°C and the equilibrium water vapor pressure at 50°C (ΔVP_{50-25}) of 100 hPa or more.

<11> In another aspect, there is provided an apparatus comprising the moisture control material according to any one of items <1> to <10>.

EFFECTS

[0007] According to the present disclosure, a moisture control material having high moisture absorption properties, of which aqueous solution has low viscosity with low corrosiveness to metals, can be provided.

BRIEF DESCRIPTION OF DRAWINGS

[0008] Figure 1 is a graph showing measurement results of the water vapor absorption capacity of a specific salt (11).

Figure 2 is a graph showing measurement test results of the equilibrium water vapor pressure of a specific salt (11).

Figure 3 is a graph showing measurement test results of the corrosiveness to metals of a specific salt (11).

Figure 4 is a graph showing measurement results of temperature-variable viscosity of each sample.

Figure 5 is a graph showing ΔVP_{50-25} for each sample.

DESCRIPTION OF EMBODIMENTS

[0009] An embodiment of the present invention is described in