Summary

In one aspect, the present disclosure refers to an immunogenic composition containing at least one antigen and at least one adjuvant with:

- said adjuvant comprising at least one Metal-Organic Framework, MOF, comprising an inorganic part based on aluminum and an organic part based on at least one polydentate ligand chosen from fumarate, muconate, mesaconate, oxalate, oxaloacetate, succinate, malate, citrate, aconitate, isophthalate, substituted isophthalate, 2,5-thiophenedicarboxylate, 2,5-furandicarboxylate, trimesate, trimellitate and pyromellitate, and
- said antigen being immobilized at least within said Metal-Organic Framework.

In another aspect, the present disclosure refers to a Metal-Organic Framework comprising an inorganic part based on aluminum and an organic part based on polydentate ligand chosen from fumarate, muconate, mesaconate, oxalate, oxaloacetate, succinate, malate, citrate, aconitate, isophthalate, substituted isophthalate, 2,5-thiophenedicarboxylate, 2,5-furandicarboxylate, trimesate, trimellitate and pyromellitate, for use to immobilize an antigen, in a vaccine adjuvant, said antigen being immobilized at least within said Metal-Organic Framework.

In yet another aspect, the present disclosure refers to use of a Metal-Organic Framework comprising an inorganic part based on aluminum and an organic part based on polydentate ligand chosen from fumarate, muconate, mesaconate, oxalate, oxaloacetate, succinate, malate, citrate, aconitate, isophthalate, substituted isophthalate, 2,5-thiophenedicarboxylate, 2,5-furandicarboxylate, trimesate, trimellitate and pyromellitate, to immobilize an antigen, in a vaccine adjuvant, said antigen being immobilized at least within said Metal-Organic Framework.

In still another aspect, the present disclosure refers to a process for preparing an immunogenic composition of the present disclosure, comprising at least the step consisting to react at least one aluminum compound with at least one polycarboxylic acid chosen from fumaric acid, muconic acid, mesaconic acid, oxalic acid, oxaloacetic acid, succinic acid, malic acid, citric acid, aconitic acid, isophthalic acid, substituted isophthalic acid, 2,5-thiophenedicarboxylic acid, 2,5-furandicarboxylic acid, trimesic acid, trimellitic acid or pyromellitic acid and/or with at least one polycarboxylate chosen from fumarate, muconate, mesaconate, oxalate, oxaloacetate, succinate, malate, citrate, aconitate, isophthalate, substituted isophthalate, 2,5-thiophenedicarboxylate, 2,5-furandicarboxylate, trimesate, trimellitate and pyromellitate, in the presence of at least one antigen, for forming at least one Al-polycarboxylate Metal-Organic Framework immobilizing said antigen.

Detailed Description

The invention is directed to an immunogenic composition containing at least one antigen and at least one adjuvant with said adjuvant comprising at least one Metal-Organic Framework, MOF, comprising an inorganic part based on aluminum and an organic part based on at least one polydentate ligand, and said antigen being immobilized at least within said Metal-Organic Framework.

Therefore, according to one of its aspects, the invention is directed to an immunogenic composition containing at least one antigen and at least one adjuvant with said adjuvant comprising at least one Metal-Organic Framework, MOF, comprising an inorganic part based on aluminum and an organic part based on at least one polydentate ligand chosen from fumarate, muconate, mesaconate, oxalate, oxaloacetate, succinate, malate, citrate, aconitate, isophthalate, substituted isophthalate, 2,5-thiophenedicarboxylate, 2,5-furandicarboxylate, trimesate, trimellitate and pyromellitate, and said antigen being immobilized at least within said Metal-Organic Framework.

Preferably, the invention is directed to an immunogenic composition containing at least one antigen and at least one adjuvant with said adjuvant comprising at least one Metal-Organic Framework, MOF, comprising an inorganic part based on aluminum and an organic part which at least comprises a fumarate, and said antigen being immobilized at least within said Metal-Organic Framework.

As used herein, the term “immobilized” is intended to mean that the antigen is associated with the Metal-Organic Framework, and at least within the Metal-Organic Framework and the antigen is no longer in the fluid phase. The immobilization may occur by different ways. The immobilization may occur using a single step process, meaning the MOF formation and the immobilization is occurring simultaneously. The Metal-Organic Framework may entrap, by surrounding or encapsulating, the antigen. In some other conditions, the antigen may also be included into the pores of the Metal-Organic Framework, or the antigen may be adsorbed onto the external surface of the Metal-Organic Framework. The antigen can also be linked to the Metal-Organic Framework, notably by covalent bonds. It is understood that the antigens immobilization is not limited to these types of immobilization and can take place in different ways in the same Metal-Organic Framework.

The antigen may be immobilized within the MOF means that although not necessarily located in the pores of the MOF, the antigen is entrapped between MOF particles forming a non-soluble phase.