Summary

In a first aspect, there is provided an aqueous dispersible polymer composition comprising: (i) a hydroxyl functional dendritic polymer, wherein the hydroxyl functional dendritic polymer is completely unmodified; (ii) one or more polar compounds, said polar compounds being miscible with both said hydroxyl functional dendritic polymer and an aqueous solvent; and wherein the one or more polar compounds are present in an amount sufficient to disperse saidthe hydroxyl functional dendritic polymer in saidthe aqueous solvent, wherein the weight ratio of said hydroxyl functional dendritic polymer to said polar compounds is from about 1:9 to about 4:1.

Advantageously, the dendritic polymer is capable of being dispersed in an aqueous solvent without the need to functionalize the peripheral surface of the dendritic polymer with one or more ionic groups.

It has been observed that when the dendritic polymer has been functionalized with ionic groups, such as carboxyl groups, the performance of a coating prepared from the functionalized dendritic polymer may exhibit inferior chemical/water resistance, when compared to a coating prepared from a dendritic polymer that has not been functionalized with pendant ionic groups. Conversely, a dendritic polymer that has not been functionalized is incapable of being dispersed in an aqueous solvent and tends to experience phase separation when mixed with an aqueous solvent. This results in an unstable polymer composition that cannot be readily, if at all, formed into a coating film.

Advantageously, the aqueous dispersible polymer composition disclosed herein avoids the abovementioned drawbacks by being capable of dispersing in an aqueous solvent without requiring functionalization with ionic moieties. Hence, the disclosed polymer compositions may also be used to prepare water-based coatings having superior coating performance, particularly, in terms of

chemical and water resistance. Also advantageously, the disclosed aqueous dispersible polymer composition is stable in admixture with an aqueous solvent and can be readily mixed with cross-linkers to form a coating composition.

In a second aspect, there is provided an aqueous polymer dispersion comprising: (i) at least one~~a~~ hydroxyl functional dendritic polymer, wherein the hydroxyl functional dendritic polymer is completely unmodified; (ii) one or more polar compounds, said polar compounds being miscible with both said hydroxyl functional dendritic polymer and an aqueous solvent; and (iii) an aqueous solvent, wherein the weight ratio of said hydroxyl functional dendritic polymer to said polar compounds is from about 1:9 to about 4:1. In one embodiment, the aqueous solvent is water.

Advantageously, the aqueous polymer dispersion is stable for prolonged storage and does not suffer from phase separation. Also advantageously, there is no requirement to functionalize the dendritic polymer to provide the above disclosed polymer dispersion. Hence, the process of obtaining the aqueous polymer dispersion is simplified and results in time / cost savings. As also discussed, the disclosed aqueous polymer dispersion can be used to prepare an aqueous phase coating such as, a water-based coating, that demonstrates superior chemical / water resistance, compared to a water-based coating prepared from an aqueous polymer dispersion, wherein the dendritic polymer has been functionalized with ionic groups.

In a third aspect, there is provided a ~~two component~~ coating composition comprising a first component and second component, wherein said first component comprises~~ing~~: (i) at least one~~a~~ hydroxyl functional dendritic polymer, wherein the hydroxyl functional dendritic polymer is completely unmodified; (ii) one or more polar compounds, said polar compounds being miscible with both said hydroxyl functional dendritic polymer and an aqueous solvent; (iii) an aqueous solvent~~water~~; and said second component comprising (iv) one or more cross-linkers; and wherein said~~the~~

first and second components, when ~~are~~ mixed together, ~~to~~ form the ~~two component~~ coating composition, wherein the weight ratio of said hydroxyl functional dendritic polymer to said polar compounds is from about 1:9 to about 4:1.

In a fourth aspect, there is provided a process for preparing an aqueous dispersible polymer composition, said~~the~~ process comprising the steps of (a) mixing a hydroxyl functional dendritic polymer, one or more polar compounds in an aqueous solvent to form said~~the~~ aqueous dispersible polymer composition, said~~wherein the~~ one or more polar compounds ~~are~~ being selected to be miscible with both said~~the~~ hydroxyl functional dendritic polymer and said~~the~~ aqueous solvent; wherein the hydroxyl functional dendritic polymer is completely unmodified, ~~and~~ wherein said~~the~~ one or more polar compounds are provided in an amount sufficient to disperse said~~the~~ hydroxyl functional dendritic polymer in said aqueous solvent, wherein the weight ratio of said hydroxyl functional dendritic polymer to said polar compounds is from about 1:9 to about 4:1~~in the aqueous solvent~~.

In an embodiment~~a fifth aspect~~, there is provided the aqueous dispersible polymer composition as defined above for use in the preparation of a single component coating composition.

In an embodiment~~a sixth aspect~~, there is provided the aqueous dispersible polymer composition as defined above for use in preparation of a two-part coating composition.

In a fifth~~seventh~~ aspect, there is provided a process for preparing an aqueous dispersion of a hydroxyl functional dendritic polymer comprising the steps of (a) contacting a hydroxyl functional dendritic polymer with at least one polar compound to form a first component, wherein the hydroxyl functional dendritic polymer is completely unmodified, wherein the weight ratio of said hydroxyl functional dendritic polymer to said polar compounds is from about 1:9 to about 4:1; and~~,~~ (b) contacting the first component with an aqueous solvent to form the aqueous dispersion of a hydroxyl functional dendritic polymer; wherein the polar compound is miscible with the aqueous solvent and the hydroxyl functional dendritic polymer; and wherein the polar compound is provided in an amount sufficient to disperse the hydroxyl functional dendritic polymer in the aqueous solvent.