bonding agent used to adhere finishing materials to the concrete substructure. Further, the trapped moisture may cause mold and other undesired formations to occur.

[0006]It is highly desired to be able to apply a sealer /coating composition capable of inhibiting moisture vapor emission from concrete structures, to have high adhesion to concrete structures and to enhance the adhesion of a concrete substructure to finishing materials commonly used in building industry. It is also highly desired to have a composition having the above properties that can be applied to green concrete substructures as well as fully cured concrete substructures to, thereby, enhance job scheduling and completion. It is further desirable to inhibit evaporation of water during initial curing of freshly formed concrete structures to allow hydration to occur slowly during curing and thereby produce a resultant structure having high strength and integrity.

## SUMMARY ~~OF THE INVENTION~~

[0007]The present disclosure~~invention~~ is directed to a composition capable of inhibiting moisture vapor emission from concrete structures and enhancing adhesion of a finish material to the concrete structure comprising an aqueous mixture of a first copolymer of vinylidene halide and a $C_1$-$C_2$ alkyl acrylate with a second copolymer of vinylidene halide and a $C_4$-$C_5$ alkyl acrylate and to the method of forming a moisture barrier/adhesion promoter coating on concrete comprising applying from 2.8 to 5.6 liters (0.75 to 1.5 gallons) of an aqueous carrier having from 10 to 50 weight percent of the mixture of copolymers stated above per 14 $m^2$ (150 square feet) of the free surface of a concrete structure. The concrete structure unexpectedly exhibits enhanced low water vapor emission, enhanced adhesion of finished material applied thereto and inhibit spalling of the applied coating composition from the concrete surface. Further, it has been unexpectedly found that the composition of the present disclosure~~invention~~ can be applied to

surfaces of uncured or partially cured concrete structures to cause reduced evaporation of the water there from and, thus, results in formation of a structure of superior structural strength and integrity.

[0007a]In one aspect, there is provided a composition composed of an aqueous mixture of at least one first copolymer comprising mer units derived from vinylidene halide and mer units derived from $C_1$-$C_2$ alkyl acrylate, said mer units derived from $C_1$-$C_2$ alkyl acrylate being present in from 5 to 40 weight percent of the first copolymer; and at least one second copolymer comprising mer units derived from vinylidene halide and mer units derived from $C_4$-$C_5$ alkyl acrylate, said mer units derived from $C_4$-$C_5$ alkyl acrylate being present in from 3 to 40 weight percent of the second copolymer, wherein said first copolymer and said second copolymer are in a weight ratio of 90:10 to 10:90; the first and second copolymers together form from 10 to 50 weight percent of the aqueous mixture; and the aqueous mixture has a pH of 1.5 to 3.5.

[0007b]In one aspect, there is provided a method of inhibiting moisture vapor emission from the surface of a concrete structure and enhancing interfacial adhesion between the concrete surface and a covering thereon comprising applying to the concrete surface an aqueous mixture of at least one first copolymer comprising mer units derived from vinylidene halide and mer units derived from $C_1$-$C_2$ alkyl acrylate, said mer units derived from $C_1$-$C_2$ alkyl acrylate being present in from 5 to 40 weight percent of the first copolymer; and at least one second copolymer comprising mer units derived from vinylidene halide and mer units derived from $C_4$-$C_5$ alkyl acrylate, said mer units derived from $C_4$-$C_5$ alkyl acrylate being present in from 3 to 40 weight percent of the second copolymer, wherein said first copolymer and said second copolymer are in a weight ratio of 90:10 to 10:90; the first and second copolymers together form from 10 to 50 weight percent of the aqueous mixture; and the aqueous mixture has a pH of 1.5 to 3.5; said aqueous mixture substantially uniformly applied to the surface to distribute a coating having from 0.4 to 4 kg of copolymer mixture per 14 $m^2$ of free surface of the concrete structure.

[0007c]In one aspect, there is provided a method of inhibiting loss of water from an uncured or partially cured concrete structure comprising applying to the concrete surface an aqueous mixture of at least one first copolymer comprising mer units derived from vinylidene halide and mer units derived from $C_1$-$C_2$ alkyl acrylate, said mer units derived from $C_1$-$C_2$ alkyl acrylate being present in from 5 to 40 weight percent of the first copolymer; and at least one second copolymer comprising mer units derived from vinylidene halide and mer units derived from $C_4$-$C_5$ alkyl acrylate, said mer units derived from $C_4$-$C_5$ alkyl acrylate being present in from 3 to 40 weight percent of the second copolymer, wherein said first copolymer and said second copolymer are in a weight ratio of 90:10 to 10:90; the first and second copolymers together form from 10 to 50 weight percent of the aqueous mixture; and the aqueous mixture has a pH of 1.5 to 3.5; said aqueous mixture substantially uniformly applied to the surface to distribute a coating having from 0.4 to 4 kg of copolymer mixture per 14 $m^2$ of free surface of the concrete structure.

## DETAILED DESCRIPTION OF THE INVENTION

[0008]It has been unexpectedly found that a mixture of two distinct copolymers, when combined together and applied to concrete formations in prescribed amounts, forms a coating capable of adhering to the concrete formation surface, providing a moisture vapor emission barrier and acting as an interfacial adhesion enhancer between the concrete surface and adhesive bonding agents of finish coverings.

[0009]It has also been unexpectedly found that the mixture of copolymers, when applied as an aqueous composition to the surface of uncured or partially cured concrete structures, provides a means of causing the resultant cured structure to have enhanced strength and integrity. To reduce water evaporation during the curing process, one conventionally applies blankets and/or repeated application of water to the surface of the

structure while curing. Besides such applications being labor intensive and costly, the application of blankets to uncured surfaces may mar the formed structural surface and repeated application of water may reduce the strength of the resultant structure at and adjacent to its surface. These undesired properties are thus eliminated by a single application of an aqueous dispersion of the present mixture of first and second copolymers described herein below.

[0010] It has also been unexpectedly found that the present mixture provides a coating that exhibits high adhesion as well as wear and abrasion strength (tested under ASTM D4060-10) to concrete surfaces, even those that have been steel troweled to provide an ultra-smooth surface. This phenomenon is may be due to the ability of the mixture to become incorporated into portion of the concrete adjacent to the treated