

[0072] The wetness indicator composition when present on a substrate may provide for a signal visible from outside the substrate, while the product is being worn, e.g., visible to the wearer, a caregiver, parent and the like. That is, the wetness indicator compositions are affixed to the substrate at a portion which enables it to be in fluid communication with the liquid, e.g., urine, menses, blood and the like, and allows the change initial color state to its final color state to be visible to an observer. For example, color or contrast change, is visible through the substrate and/or the absorbent article, such as, the of backsheet or garment-facing covering of a disposable diaper article, which is also in fluid communication with the liquid, such as urine menses, blood and the like, deposited in the absorbent core of the substrate and/or the absorbent article.

[0073] In one optional embodiment of the present invention, the change of the colorant from its initial color state to its final color state is visible within a short time after the wetness indicator composition is contacted with a liquid, e.g., urine, menses, blood and the like. In one alternative embodiment of the present invention, the change of the colorant from its initial color state to its final color state is visible within about 15 minutes, or within about 5 minutes after a liquid, such as urine, menses, blood and the like, contacts the wetness indicator composition.

[0074] In another optional embodiments of the present invention, the substrate, or absorbent article comprising the substrate may be designed to allow liquid, such as urine, menses, blood, and the like, to contact the wetness indicator composition in certain regions of the substrate, or absorbent article at various loading levels. For example, a disposable diaper may be designed to allow urine to contact the wetness indicator composition located in the crotch region of the product on the first urination, but contact the wetness indicator composition in other regions of the disposable diaper only after the amount of urine in the disposable diaper reaches a predetermined threshold value. For example, the absorbent core of the disposable diaper may have limited ability to distribute urine from a given region of the disposable diaper until it contains sufficient urine to change the colorant in a wetness indicator from its initial color state to its final color state in this region, thereby preventing change of the wetness indicator composition in adjacent regions of the article until the overall urine loading in the disposable diaper increases above a given level. As the total urine loading in the disposable diaper increases, more regions of the disposable diaper will contain sufficient urine to change the colorant in a wetness indicator that may be located in those regions from its initial color state to its final color state.

[0075] The wetness indicator compositions may be present on a substrate in any desired pattern or configuration, including, but not limited to, stripes, dots, geometric shapes, irregular shapes, alphanumeric characters, pictorial representation of animals, pictorial representation of inanimate objects, cartoon characters, anthropomorphic images, logos, trademarks and any combination or arrangement thereof. The wetness indicating compositions may be applied in any pattern or in conjunction with permanent graphics, such as, permanent graphics on the outer surfaces of a disposable absorbent article.

[0076] In one embodiment of the present invention, the wetness indicator compositions, when present on a substrate, is typically employed at levels which are effective at providing visible signals, including from about 1 g per square

meter (gsm) to about 100 gsm, from about 5 gsm to about 75 gsm, and from about 10 gsm to about 60 gsm. However, it is to be understood that the amount of wetness indicator present on a substrate will depend upon many factors, such as but not limited to, substrate type (e.g., thick, thin, opacity, bulky, dense, other physical properties etc.), substrate material, intended use of the substrate (e.g., disposable diaper, panty liner, bandage etc.), method used for applying the wetness indicator compositions, desired intensity of signal in either dry or after contacting liquid, desired kinetics for the color change, desired stability of the color within the wetness indicator composition, desired pattern or configuration of the wetness indicator composition on substrate, and combinations thereof.

[0077] Additional information on incorporation of wetness indicating compositions in and/or on substrates and/or disposable absorbent articles can be found disclosed in U.S. Pat. No. 4,022,211 issued, on May 10, 1977, to Timmons; U.S. 6,297,42, issued on Oct. 2, 2001, to Olson; U.S. Pat. No. 6,307,119 issued on Oct. 23 2001 to Cammarota; and U.S. Patent Applications Nos. 20020007162A1 entitled "Absorbent articles having wetness indicating graphics incorporating a training zone," filed on Aug. 13 2001, published Jan. 17, 2002, in the name of Cammarota; and 20010053898A1 entitled "Absorbent articles having wetness indicating graphics providing an interactive training aid" filed on Jul. 24 2001, published Dec. 20, 2001, in the name of Olson; and WO 00/76438 published on Dec. 21, 2000, and assigned to Kimberly-Clark Worldwide Inc., and WO 00/76443 published on Dec. 21, 2000, and assigned to Kimberly-Clark Worldwide Inc.

Test Methods

A. Controlled Temperature and Humidity (CTH) Stability Test Method:

[0078] Wetness indicators, according to this method, are first made by heating up the wetness indicator composition about 10° C. above its melting point. For the compositions in the Examples A-H below, this temperature is in the range of about 95° C. to about 105° C. At this same temperature, a stainless steel bird applicator (Gardco Model Number AP-6X002ts or equivalent, Gardco Incorporated, Pompano Beach, Fla.) with a width of 4" to 6" and a gap of 0.002" is also heated. On a flat and level lab bench is placed a series of up to 10 polypropylene backsheet films with a basis weight of approximately 18 gsm with dimensions of around 3" by 8". These 10 backsheet films are separated by about 2" from one another and each is taped to the lab bench with transparent tape running across the top most edge of each film.

[0079] After taping the backsheet films to the lab bench, insulated gloves are placed on one's hands and used to remove the hot wetness indicator composition from the oven and place it in the vicinity near the top most edge of the backsheet film. The hot bird applicator is also removed from the oven and placed near the top most edge of the backsheet with its long dimension running parallel to the short 3" dimension of the backsheet film and its legs resting firmly on the lab bench rather than on the backsheet film itself. Next, the hot wetness indicator composition is dispensed along the front edge of the bird applicator and while firmly holding the left and right legs of the bird applicator with downward pressure, one firmly moves the bird applicator in the direc-