Wool fabrics having temperature sensitive shape memory effect were fabricated by using a shape memory polyurethane (SMPU) treatment. The contribution of SMPU treatment on bagging recovery and felting shrinkage, crucial properties for end use performance, was investigated by a test procedure including hot water conditions simulating laundry of garments according to the Woolmark TM31 standard. Chemical and morphological analyses, bending rigidity, and tear strength tests were also carried out to determine the effects of SMPU treatment on performance properties. SMPU treatment significantly increased weight and rigidity of fabrics. Most notably, SMPU treated wool fabric exhibited excellent temperature sensitive bagging recovery stimulated by a washing procedure. Also, anti-felting and weight loss performances were quite high compared to raw and commercial polyurethane-treated fabrics.