

The Layer Laboratory: A Calculus for Additive and Subtractive Composition of Anisotropic Surface Reflectance

Supplemental Material - Validation plots for additive and subtractive layer composition

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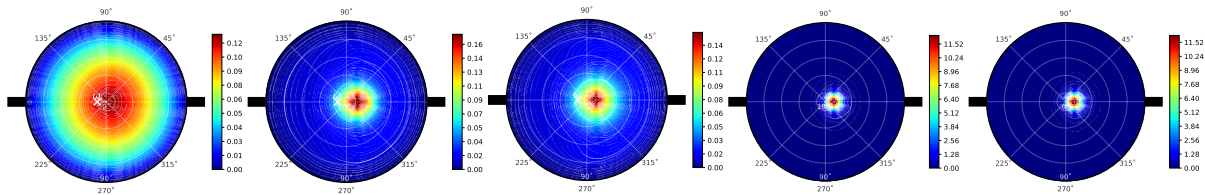
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1 ADDING MEASURED MATERIAL 1: CARDBOARD

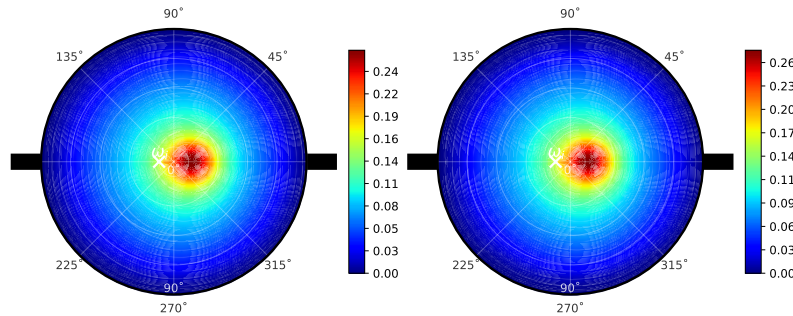


(a) Measured cardboard (b) Measured PP film (c) Added result (d) Measured reference

1.1 $\theta_i = 10^\circ$

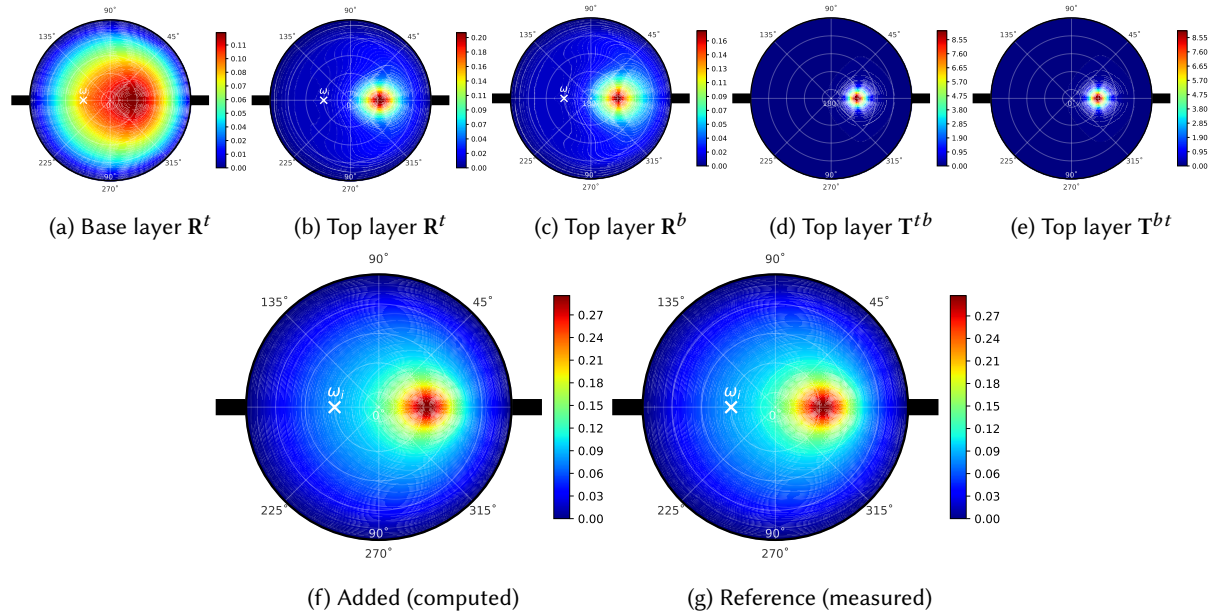


(a) Base layer R^t (b) Top layer R^t (c) Top layer R^b (d) Top layer T^{tb} (e) Top layer T^{bt}

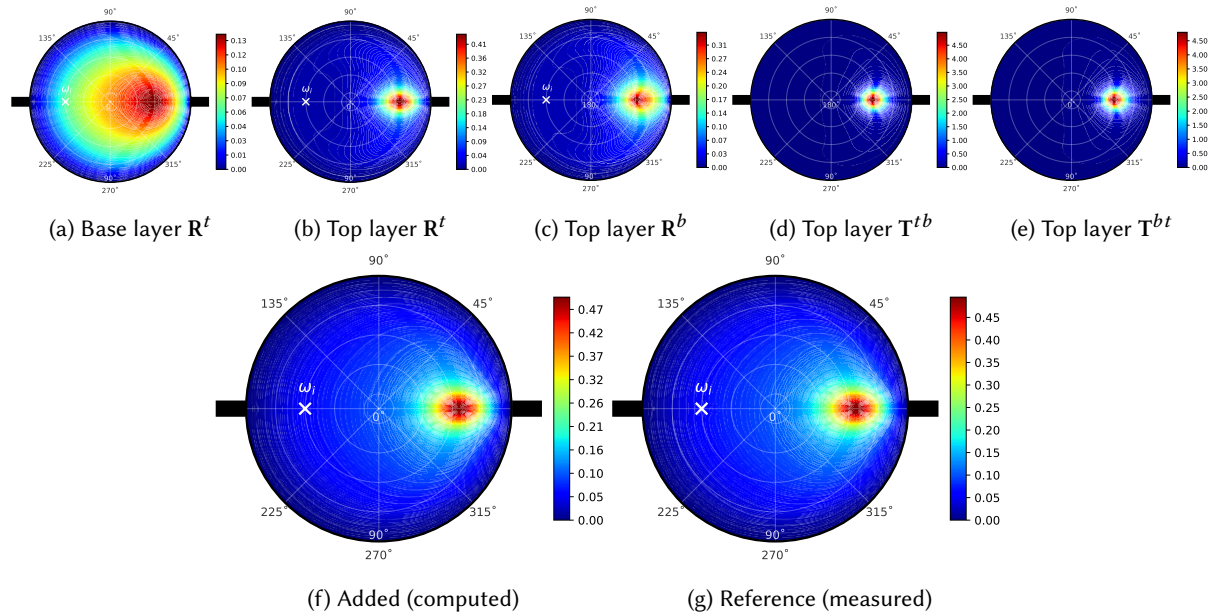


(f) Added (computed) (g) Reference (measured)

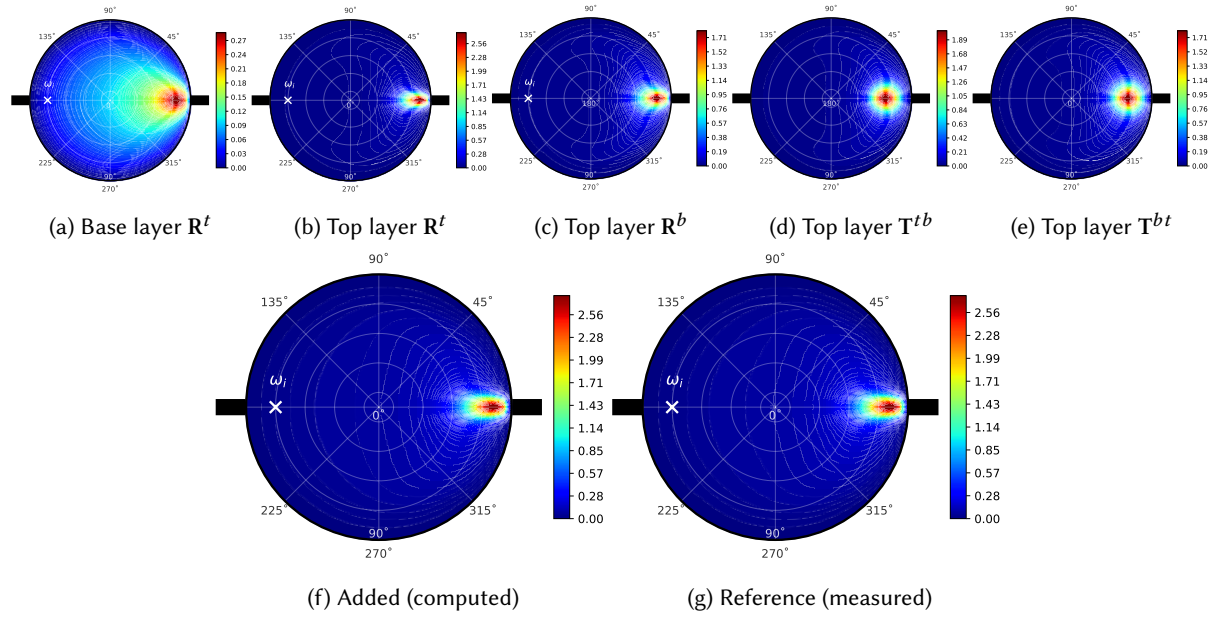
1.2 $\theta_i = 30^\circ$



1.3 $\theta_i = 50^\circ$



1.4 $\theta_i = 70^\circ$



2 ADDING MEASURED MATERIAL 2: METALLIC PAPER



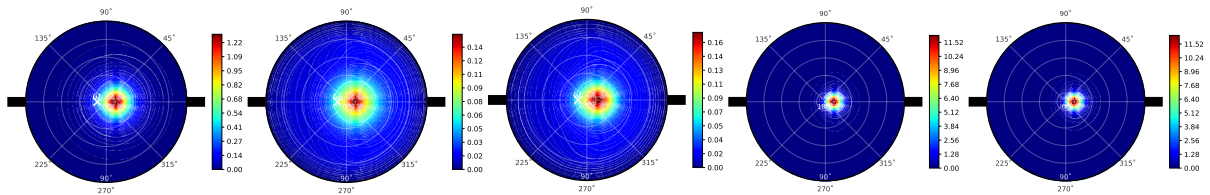
(a) Measured metallic paper

(b) Measured PP film

(c) Added result

(d) Measured reference

2.1 $\theta_i = 10^\circ$



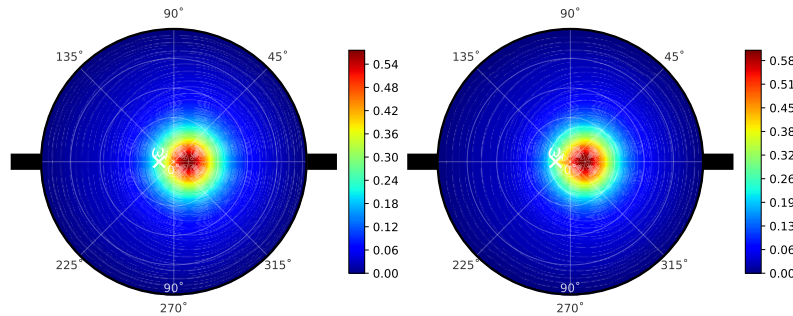
(a) Base layer R^t

(b) Top layer R^t

(c) Top layer R^b

(d) Top layer T^{tb}

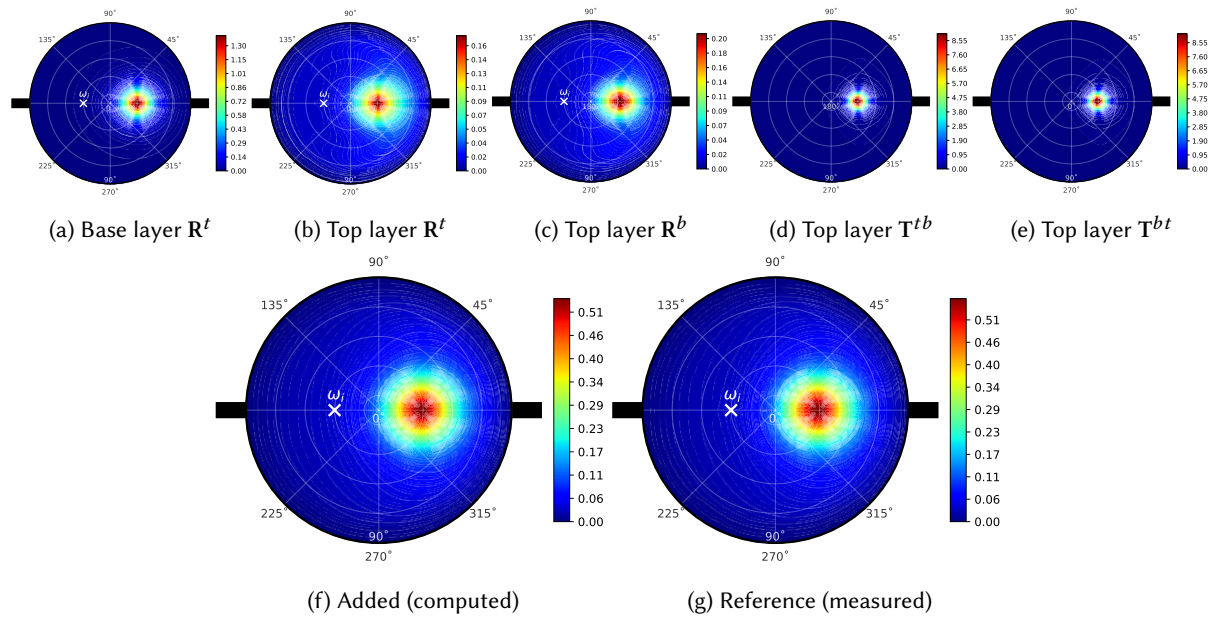
(e) Top layer T^{bt}



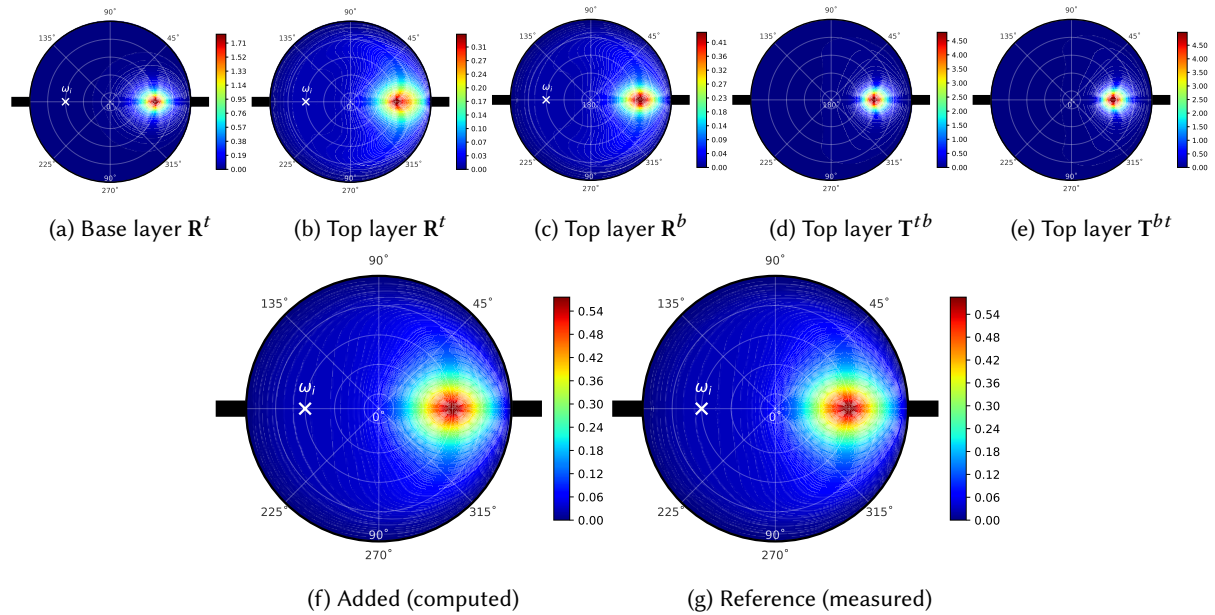
(f) Added (computed)

(g) Reference (measured)

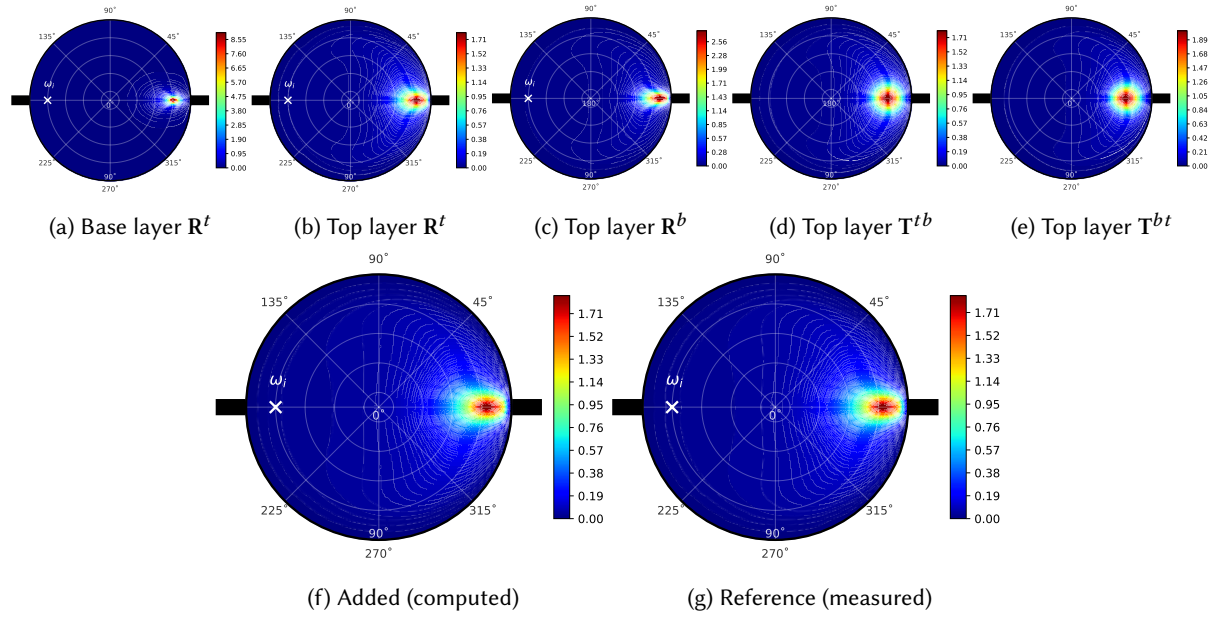
2.2 $\theta_i = 30^\circ$



2.3 $\theta_i = 50^\circ$



2.4 $\theta_i = 70^\circ$

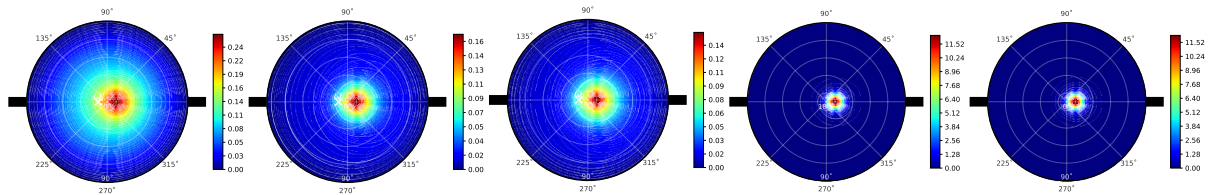


3 SUBTRACTING MEASURED MATERIAL 1: CARDBOARD

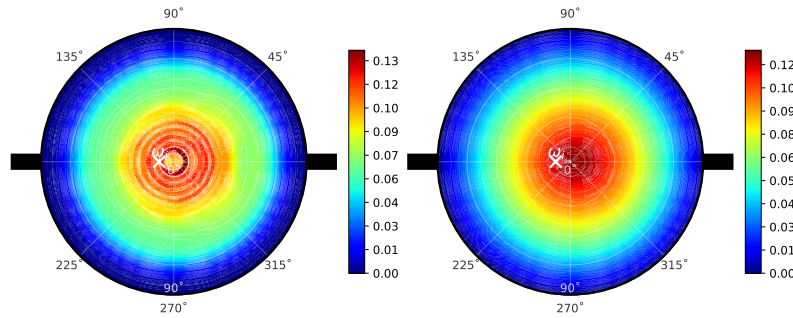


(a) Combined (measured) (b) Measured PP film (c) Subtracted result (d) Measured reference

3.1 $\theta_i = 10^\circ$

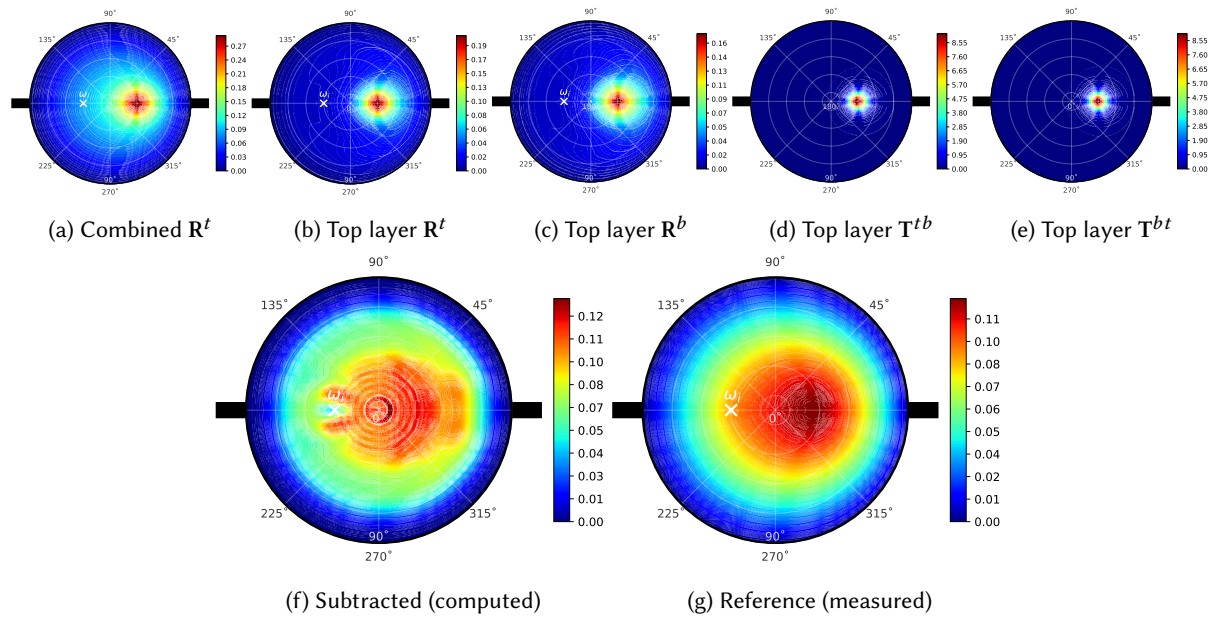


(a) Combined R^t (b) Top layer R^t (c) Top layer R^b (d) Top layer T^{tb} (e) Top layer T^{bt}

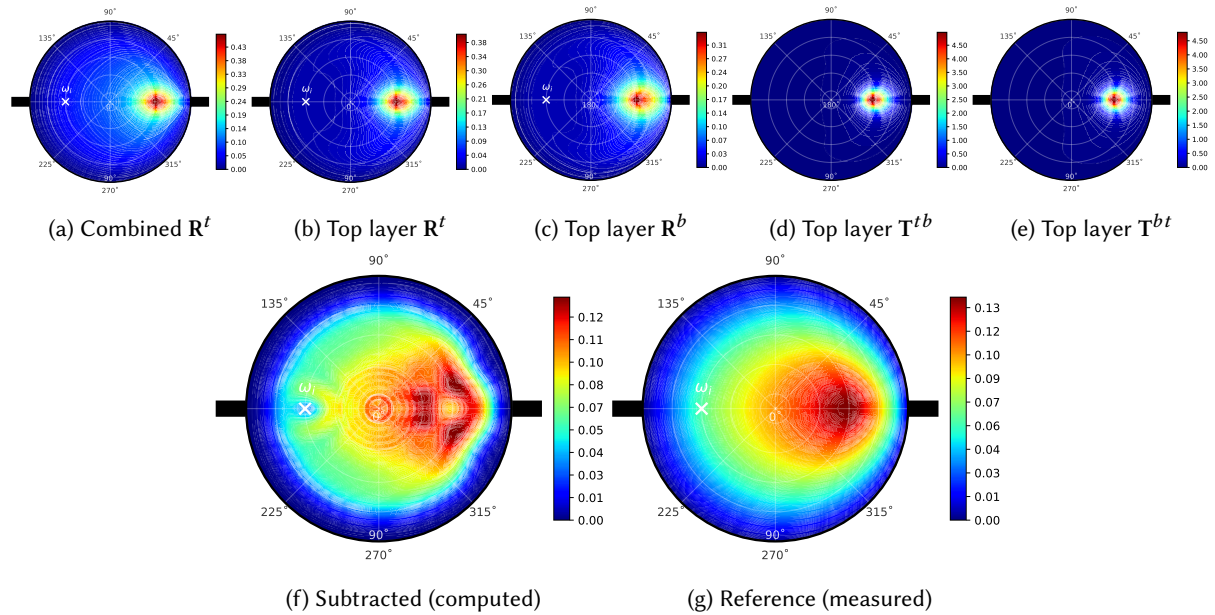


(f) Subtracted (computed) (g) Reference (measured)

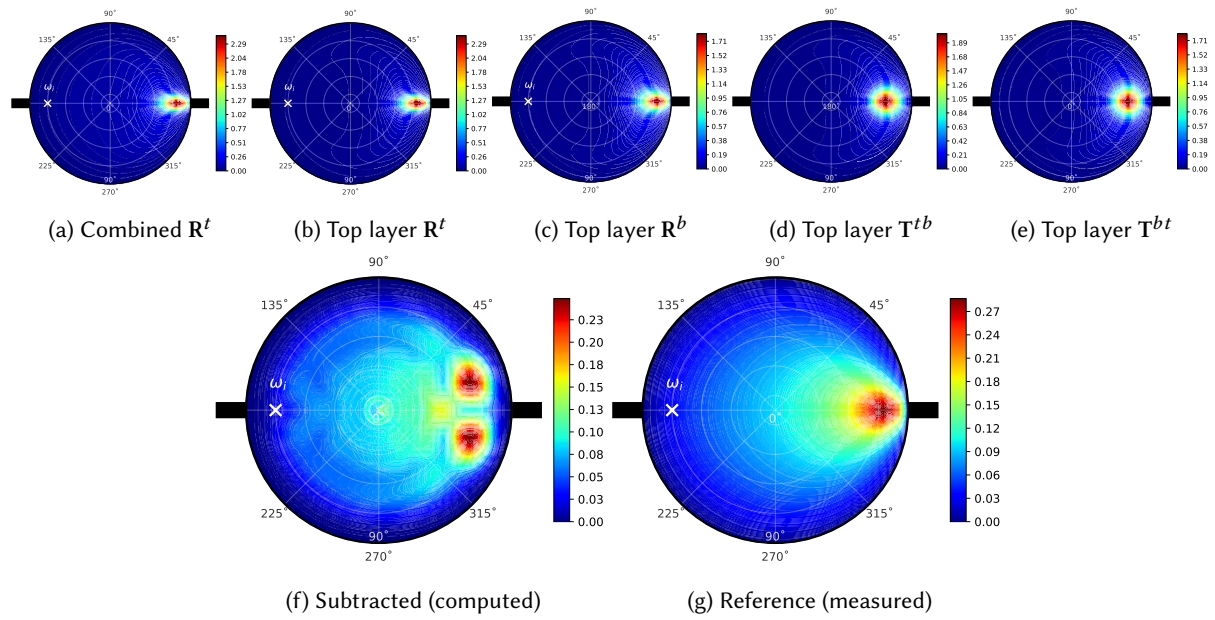
3.2 $\theta_i = 30^\circ$



3.3 $\theta_i = 50^\circ$



3.4 $\theta_i = 70^\circ$



4 SUBTRACTING MASURED MATERIAL 2: METALLIC PAPER



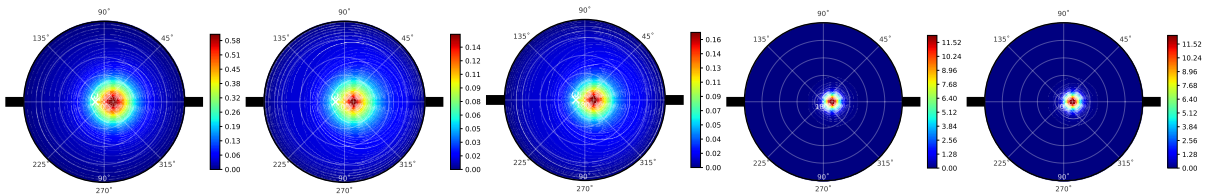
(a) Combined (measured)

(b) Measured PP film

(c) Subtracted result

(d) Measured reference

4.1 $\theta_i = 10^\circ$



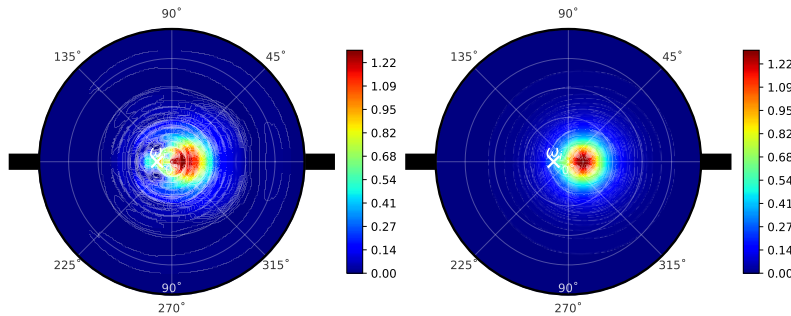
(a) Combined R^t

(b) Top layer R^t

(c) Top layer R^b

(d) Top layer T^{tb}

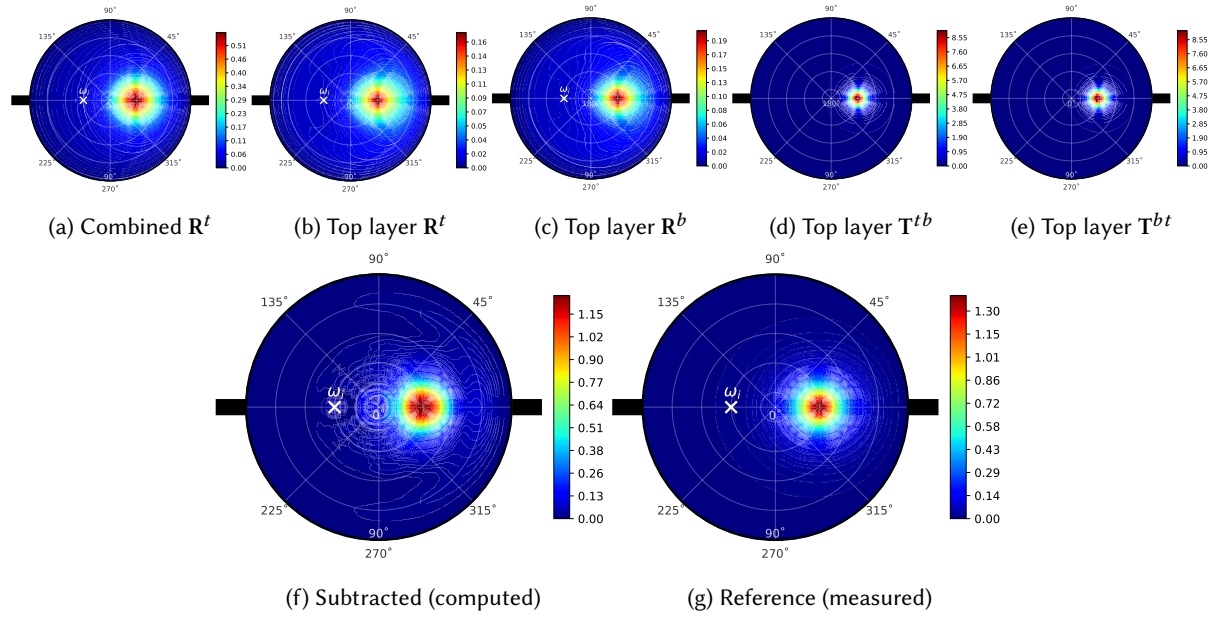
(e) Top layer T^{bt}



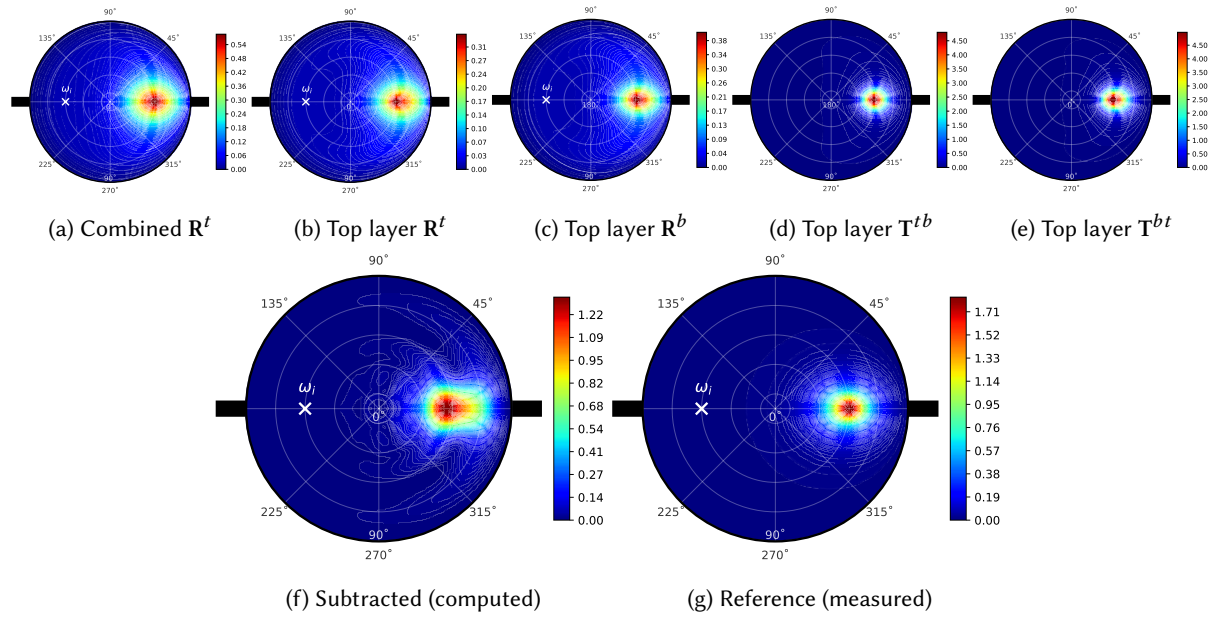
(f) Subtracted (computed)

(g) Reference (measured)

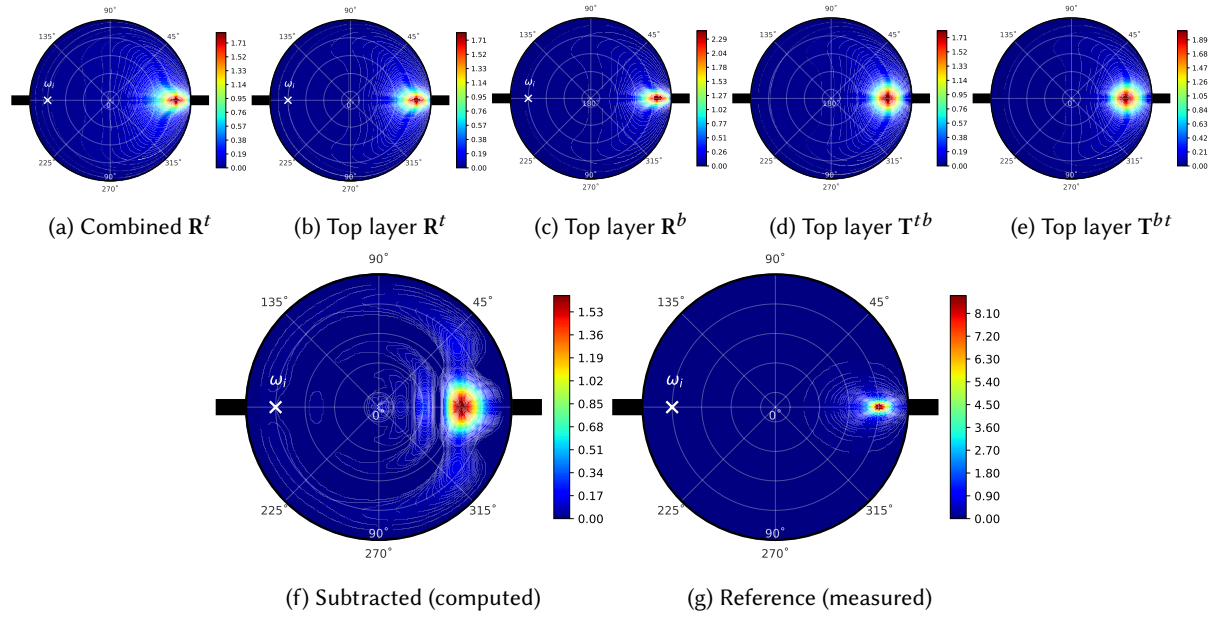
4.2 $\theta_i = 30^\circ$



4.3 $\theta_i = 50^\circ$



4.4 $\theta_i = 70^\circ$



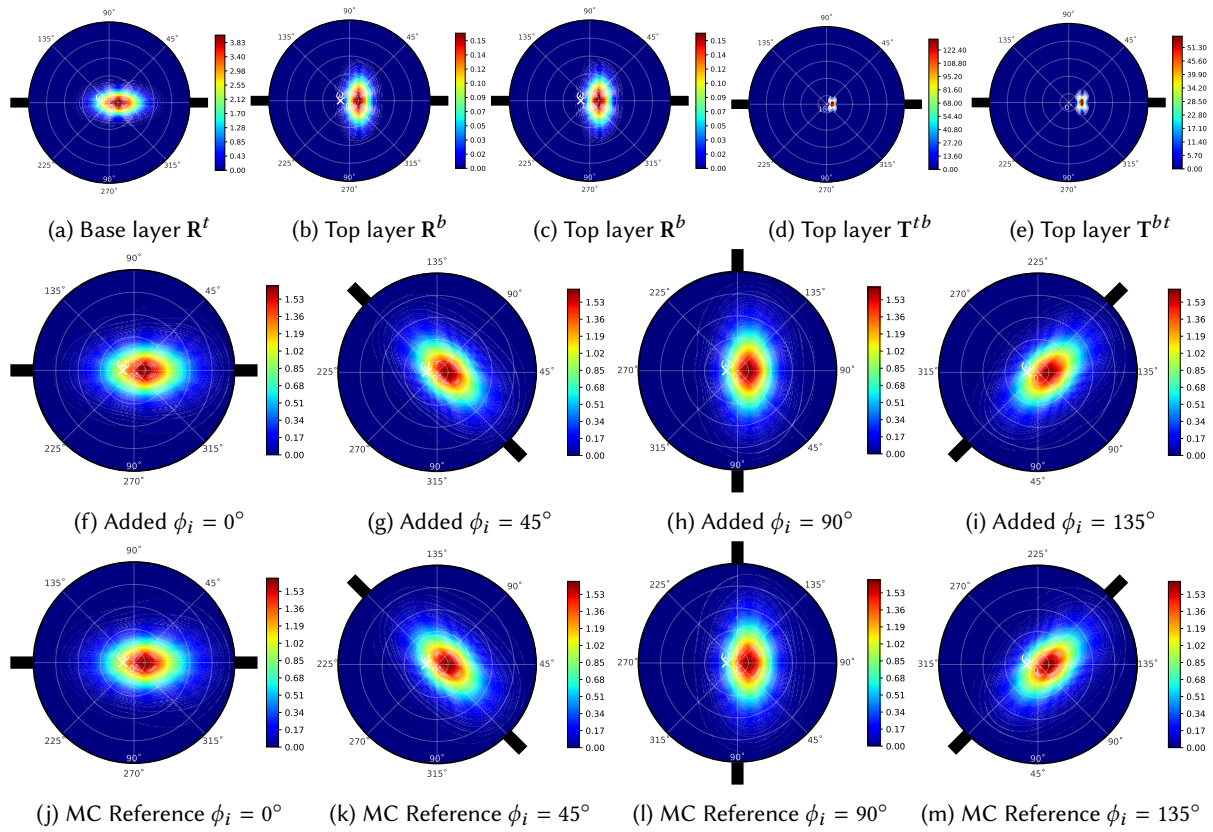
5 ADDING (ANISOTROPIC) ANALYTIC MICROFACET DATA



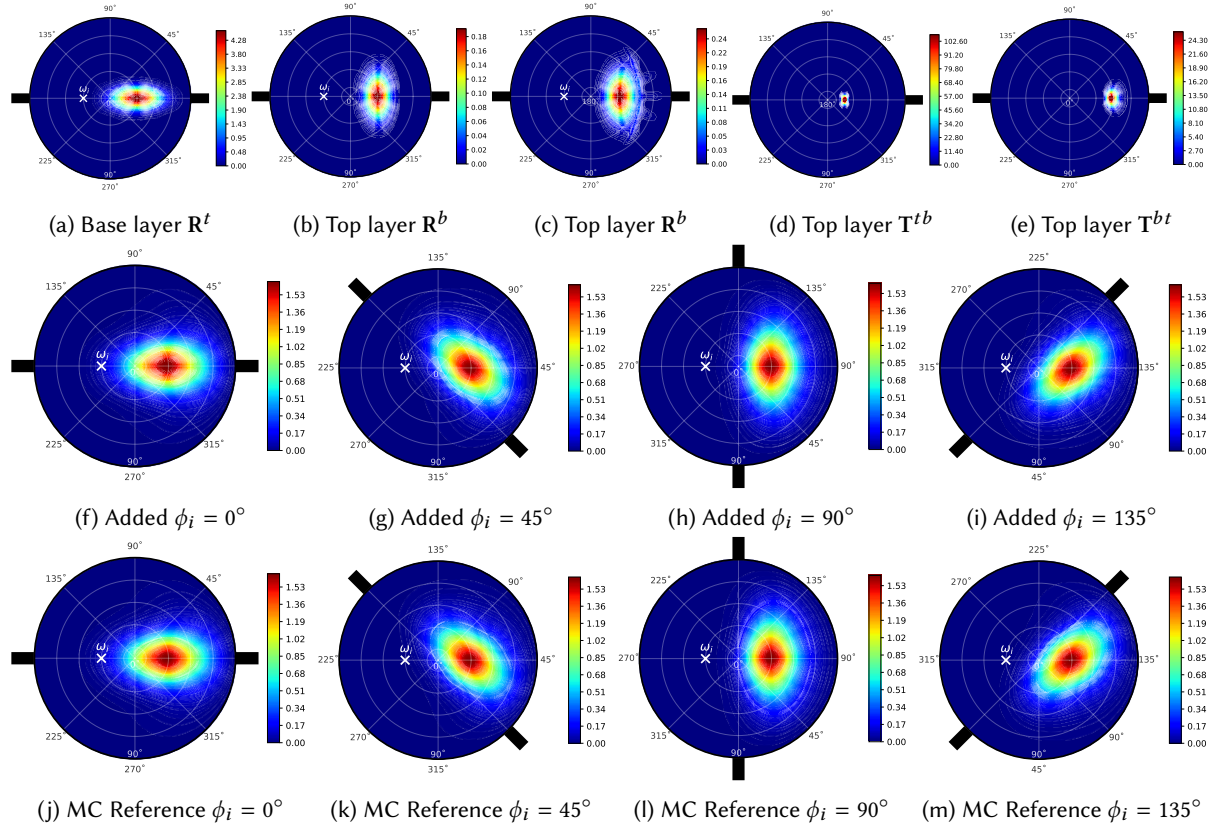
(a) Microfacet conductor
($\alpha_u = 0.2, \alpha_v = 0.1$)

(b) Microfacet dielectric
($\eta = 1.5, \alpha_u = 0.1, \alpha_v = 0.2$)

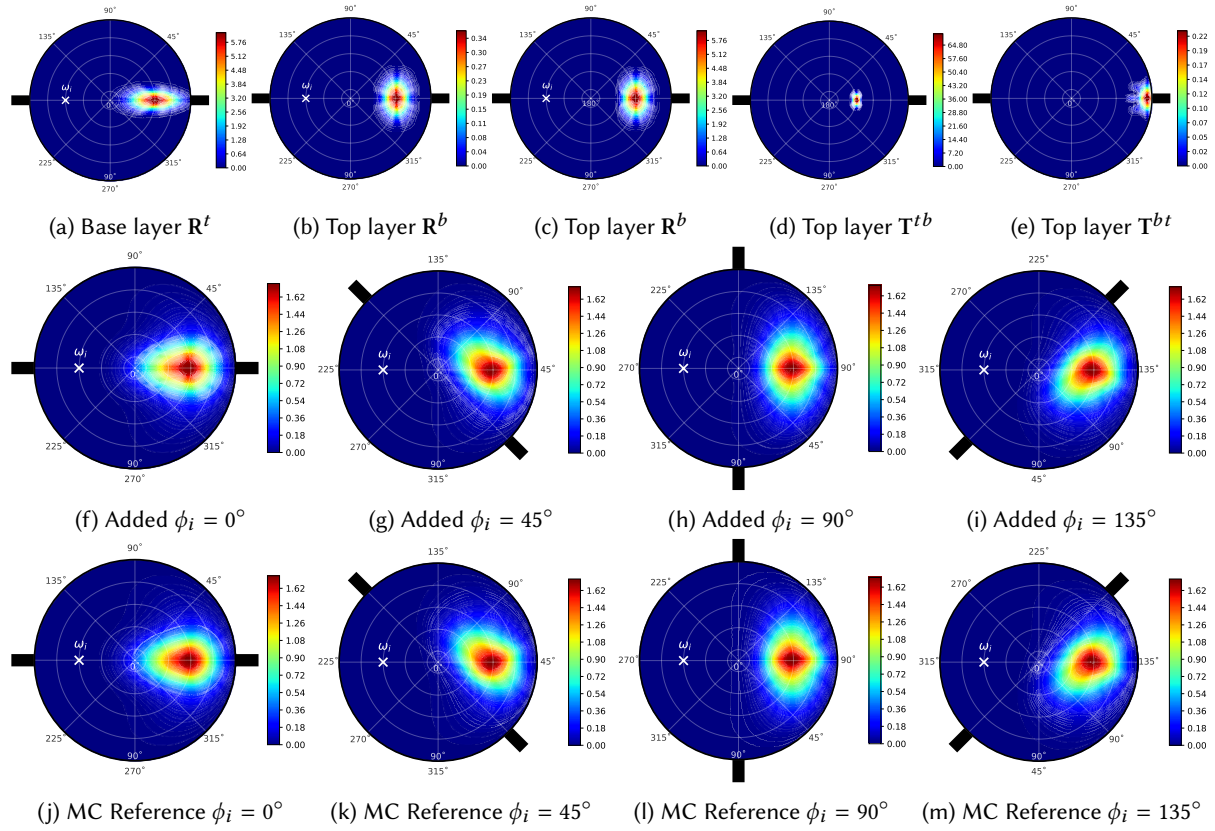
(c) Result after applying the *adding equations* on the specified ingredient layers.

5.1 $\theta_i = 10^\circ$ 

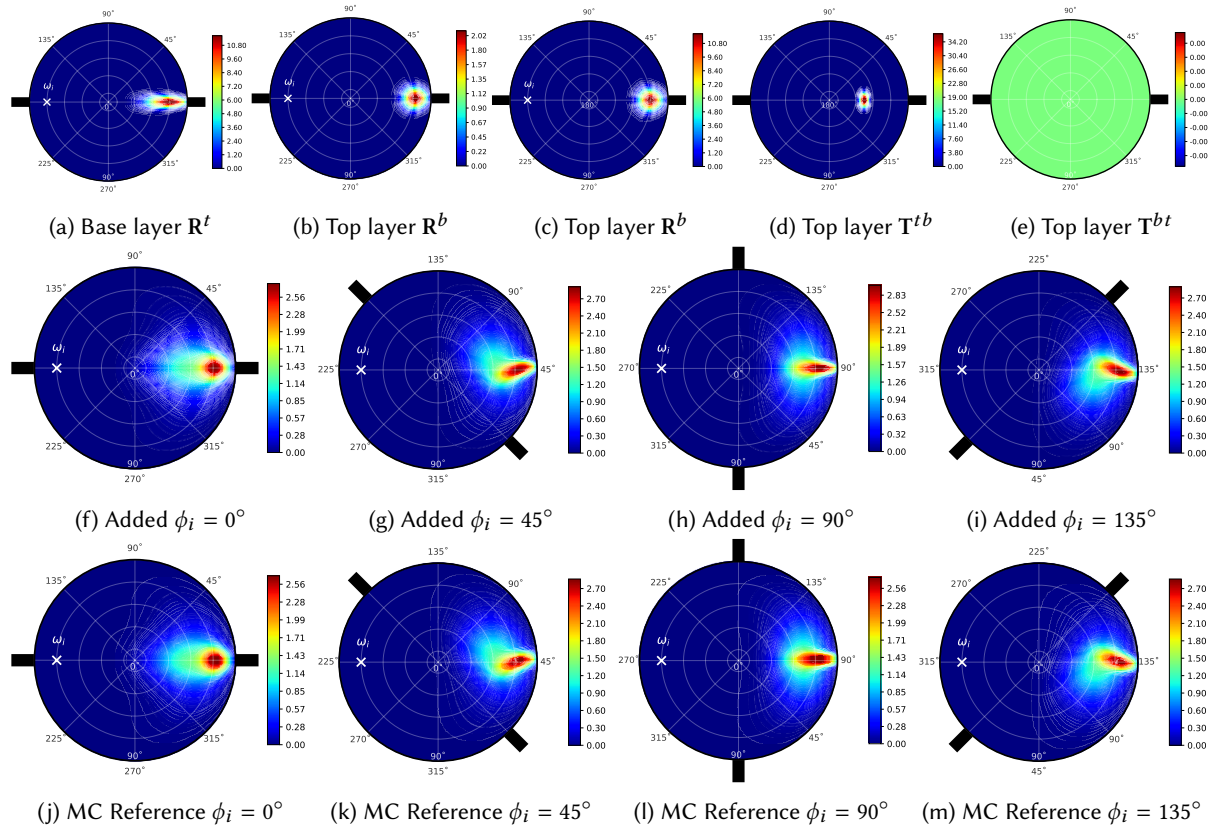
5.2 $\theta_i = 30^\circ$



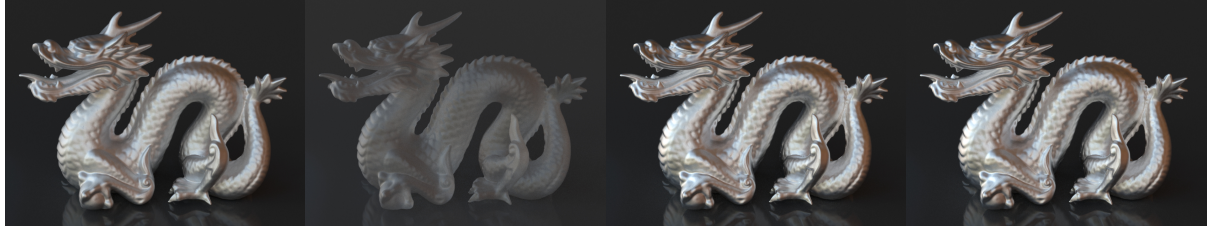
5.3 $\theta_i = 50^\circ$



5.4 $\theta_i = 70^\circ$

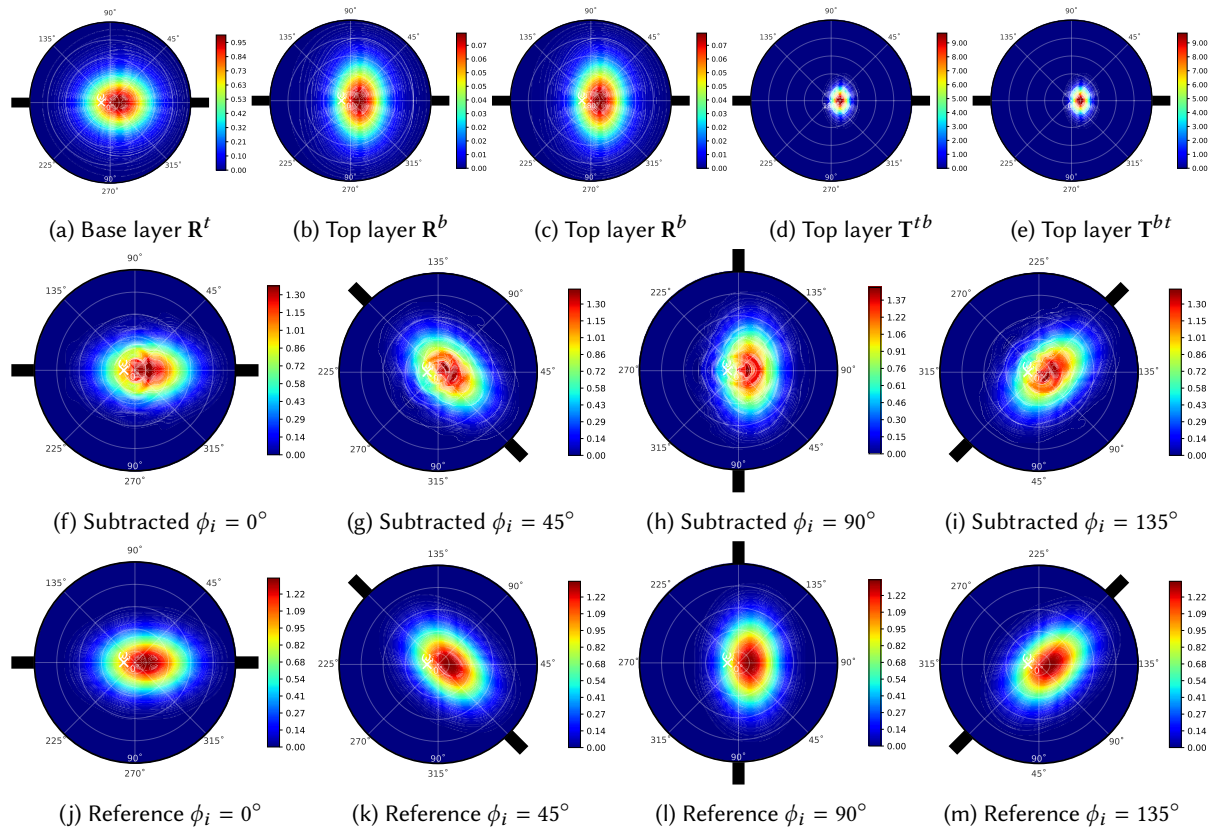


6 SUBTRACTING (ANISOTROPIC) ANALYTIC MICROFACET DATA

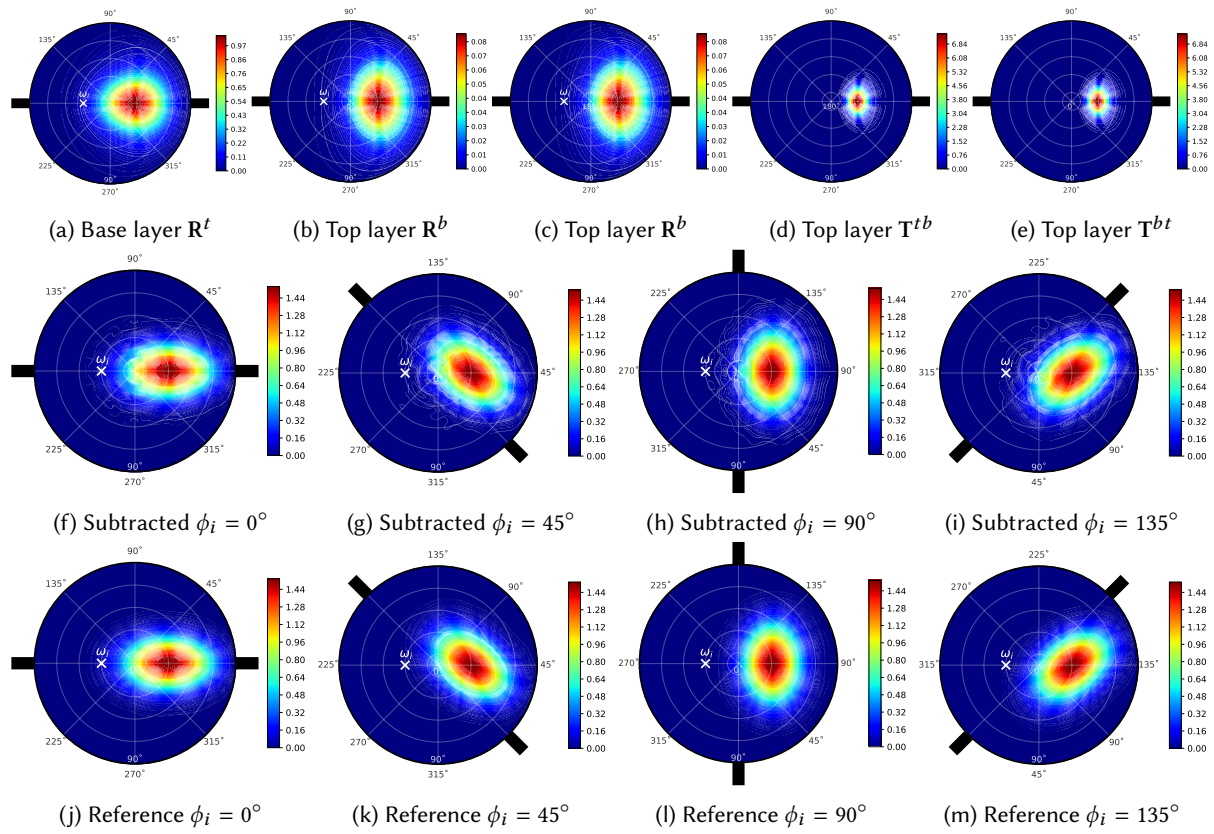


(a) Layered microfacets (Analytic) (b) Double-sided dielectric ($\eta = 1.5, \alpha_u = 0.2, \alpha_v = 0.3$) (c) Result after applying the subtracting equations (d) (Reference) conductor base ($\alpha_u = 0.3, \alpha_v = 0.2$)

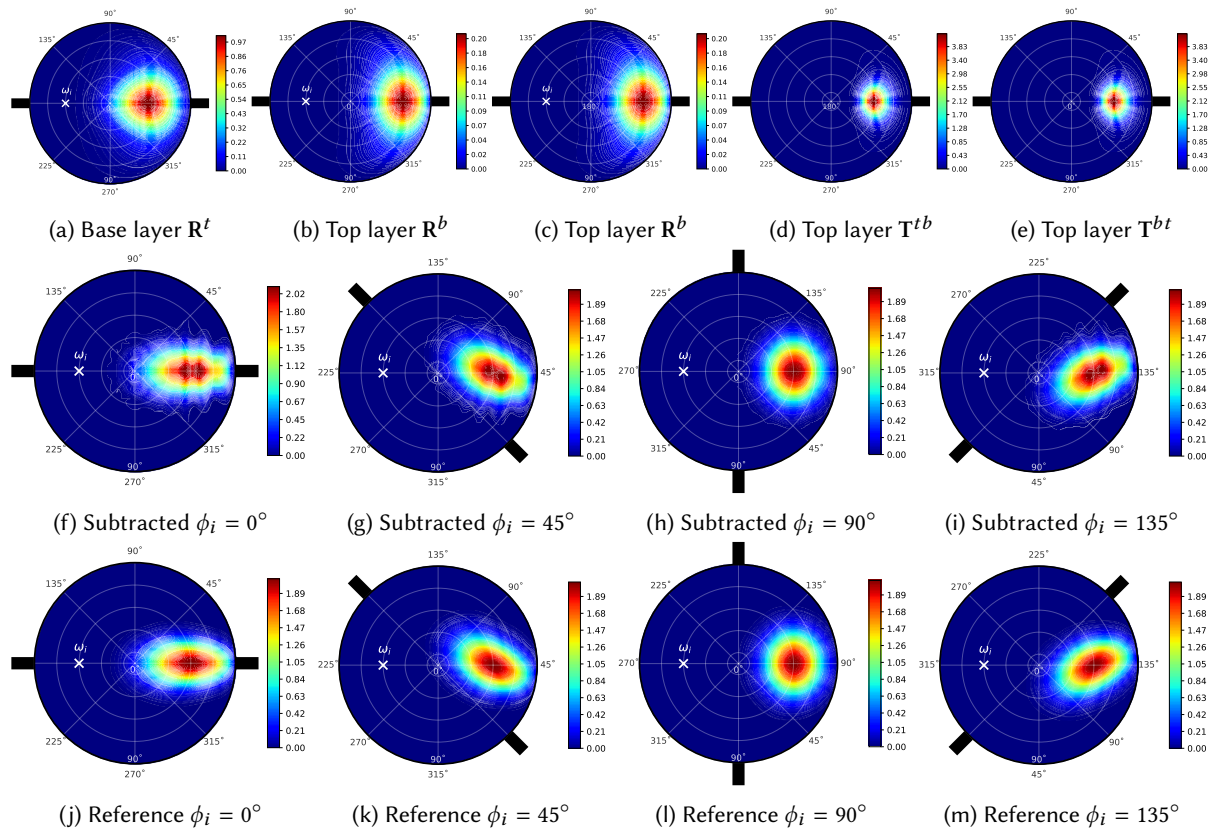
6.1 $\theta_i = 10^\circ$



6.2 $\theta_i = 30^\circ$



6.3 $\theta_i = 50^\circ$



6.4 $\theta_i = 70^\circ$

